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JOINT STRIKE FIGHTER ACROSS THE ATLANTIC TO UNIFY OR DIVIDE?

by

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This thesis examines the procurement of fighter aircraft as an indication of transatlantic relations. Specifically it asks if European rationale toward purchasing the Joint Strike Fighter indicates its position toward increasing military capabilities and the importance placed on defense cooperation with the United States. Certain observers have suggested that the relentless U.S. pursuit of technology in the "Revolution in Military Affairs" has exacerbated the capabilities gap and encouraged the U.S. to act unilaterally. This thesis argues the JSF offers allies a means to circumvent recent damage done in the Atlantic Alliance. Through a case study of four countries "expected" to purchase the JSF to replace U.S.-made F-16 aircraft, this thesis concludes that rationale for some who have heretofore abstained from the program is worrisome, but the *fact* that some are electing to pursue other choices indicates further divergences in the transatlantic realm. Through the views of these countries and looking at the larger picture, the JSF will further divide Europe and the U.S. in defense relations, as the pursuit of military technology threatens to drive the U.S. away from multilateralism and toward a "buy our equipment or be left out" stance on the so-called network centric battlefield.

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JOINT STRIKE FIGHTER ACROSS THE ATLANTIC: TO UNIFY OR DIVIDE?

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ABSTRACT

This thesis examines the procurement of fighter aircraft as an indication of transatlantic relations. Specifically it asks if European rationale toward purchasing the Joint Strike Fighter indicates its position toward increasing military capabilities and the importance placed on defense cooperation with the United States. Certain observers have suggested that the relentless U.S. pursuit of technology in the "Revolution in Military Affairs" has exacerbated the capabilities gap and encouraged the U.S. to act unilaterally. This thesis argues the JSF offers allies a means to circumvent recent damage done in the Atlantic Alliance. Through a case study of four countries "expected" to purchase the JSF to replace U.S.-made F-16 aircraft, this thesis concludes that rationale for some who have heretofore abstained from the program is worrisome, but the *fact* that some are electing to pursue other choices indicates further divergences in the transatlantic realm. Through the views of these countries and looking at the larger picture, the JSF will further divide Europe and the U.S. in defense relations, as the pursuit of military technology threatens to drive the U.S. away from multilateralism and toward a "buy our equipment or be left out" stance on the so-called network centric battlefield.

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LIST OF ABBREVIATIONS AND ACRONYMS

AWACS	Airborne Warning and Control System
BVR	Beyond Visual Range
C2	Command and Control
C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance
DCI	Defense Capabilities Initiative
DOD	Department of Defense
DTSI	Defense Trade Security Initiative
EADS	European Aeronautic Space and Defense Agency
ECM	Electronic Countermeasures
EDA	European Defense Agency
EDEM	European Defense Equipment Market
EOTS	Electro-optical Targeting System
EPAF	European Participating Air Forces
EPG	European Partner Group
ESPD	European Security and Defense Policy
EU	European Union
EW	Electronic Warfare
FMS	Foreign Military Sales
GPS	Global Positioning System
IFF	Interrogation Friend or Foe
ISAF	International Security Assistance Force
ISR	Intelligence Surveillance and Reconnaissance
JSF	Joint Strike Fighter
JSTARS	Joint Surveillance Targeting Attack Radar System
KDA	Kongsberg Defense and Aerospace
LO	Low Observable
MIDS	Multifunction Information Distribution System
MLU	Mid-Life Upgrade
MNFP	Multi National Fighter Program

MOU	Memorandum of Understanding
NAMMA	NATO Multi-role Combat Aircraft Development and Production Management Agency
NATO	North Atlantic Treaty Organization
OAF	Operation ALLIED FORCE
OEF	Operation ENDURING FREEDOM
PCC	Prague Capabilities Commitment
PGM	Precision Guided Munitions
PSFD	Production Sustainment and Follow-on Development
R and D	Research and Development
RMA	Revolution in Military Affairs
RSI	Rationalization Standardization and Interoperability
SAM	Surface to Air Missile
SDD	System Design and Development
STANAG	Standardization Agreement
STOVL	Short Takeoff and Vertical Landing
VLO	Very Low Observable

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I. INTRODUCTION

This study examines the procurement of fighter aircraft as an indication of relations in the Euro-Atlantic realm. The march of technological progress symbolizes both a bane and blessing for the United States Armed Forces. Such progress has increased efficiency in all aspects of combat operations from deployment and logistics to global precision strike, matched by no other military force in modern history. At the same time, however, advances in American technology and its implementation in combat equipment have led to huge gaps in military capabilities between the U.S. and its allies, most importantly European members of the North Atlantic Treaty Organization (NATO). In 2006, NATO stands at the precipice of an even larger fissure than of 2003 following the Iraq War; the pursuit of military technology threatens to drive the U.S. away from multilateralism and toward a "buy our equipment or be left out" attitude on the so-called network centric battlefield.

This thesis studies the Joint Strike Fighter program as the technological portal to the modern battlefield and as a paradigm for transatlantic defense cooperation. It holds that maximum participation in this project would serve to increase allied capabilities and interoperability and consequently encourages the United States to seek maximum coalition partners in future operations. While unrealistic to imagine all NATO members purchasing this aircraft, the study argues that certain countries are "expected" to buy the JSF. Of note are those smaller nations unable to indigenously produce fighters or purchase more than one sort, and/or those that have flown F-16's for the same reasons and wish to continue this positive relationship with America. The rationale germane to these nations' stance toward the JSF program will elucidate the direction the European allies are taking with respect to closing the capabilities gap and the importance they place on working with the U.S. military in the future. Thus, this thesis will treat the JSF acquisition as a case study to highlight the seriousness of the European allies toward increasing their own military capabilities and the significance they still place on defense cooperation with the United States.

A. RELEVANCE

A study of the Joint Strike Fighter is relevant for two principal reasons. Firstly, the purchase of fighter aircraft is an important national political decision involving security and defense which offers insight into positions of the respective allied leadership. Because of the long lifecycle of fighter planes when compared to other systems and the significant portions they command of defense budgets, the acquisition of such leading edge materiel gives a clear picture of a nation's defense posture and the priorities placed on its national security. Fighter aviation today continues to be viable as a strategic instrument of national power and alliance cohesion and a key component to dominate the modern multinational battlefield (though certainly not the only necessary element). Second, the JSF represents the future of fighter aircraft both with regard to technology and the current transatlantic cooperative nature of defense industrial bases. It is the only "5th-generation" fighter currently available to NATO air forces, with the latest in stealth technology required to defeat modern threats in the air and on the ground as well as an integrated and cohesive electronic warfare suite unmatched by legacy platforms. Its unprecedented allied involvement in the design and production phases qualifies it as the first true *transatlantic* co-development fighter venture in NATO. Thus, this program is a pivotal and telling example of defense procurement in the early 21st century that sheds light on transatlantic issues crucial for the future of the Alliance such as the capabilities gap and U.S./European defense cooperation.

B. BACKGROUND CONDITIONS

The topic of defense procurement as it reflects foreign and defense policy is certainly not a new one and its viability as a window into state policy is generally not questioned; but shifting dynamics in transatlantic politics, economy, and defense cooperation demand fresh analysis in the area of procurement policy. Ethan B. Kapstein has published work on not only European defense procurement as it relates to policy, but separately has written of the Joint Strike Fighter and its international implications.[1] As

[1] Ethan B. Kapstein, "Capturing Fortress Europe: International Collaboration and the Joint Strike Fighter," *Survival* 46 (Autumn 2004): 137-160. For other examples of defense procurement as it relates to foreign and defense policy see Ethan B. Kapstein, "Allies and Armaments," *Survival* 44, (Summer 2002): 141-155 and Avery Goldstein, "Discounting the Free Ride: Alliances and Security in the Postwar World," *International Organization* 49 (Winter 1995): 39-71.

the only contemporary academic work dealing with the JSF, however, it focuses on American views of the program and the international implications as they affect U.S. policy, and from a 2002 perspective. This study rather seeks insight into European views toward the JSF program as it reflects contemporary European foreign and defense policy relating to capabilities and alliance warfare. In order to do so, an overview of those more general issues affecting such policies is required, in the realm of both general transatlantic relations, specifically the evolving dynamics of alliance cohesion and defense industrial policy.

1. General Transatlantic Trends

Few would disagree that relations between the U.S. and Europe have been fragile to say the least in recent years, most of all since the U.S. invasion of Iraq in March 2003. Debate exists now as to the extent of the healing that has taken place and whether permanent damage has occurred that may drive European nations toward further autonomy in the face of America. Some hold transatlantic relations to be on the mend, evidenced by cooperation in the Iran nuclear situation and transatlantic accord on the seriousness of threats faced by Europe and the U.S. alike. This viewpoint sees the second term of the George W. Bush Presidency quite different than the first with respect to the importance it places on diplomatic relations with European allies.[2] However, tension and disagreement abounds in other arenas including what constitutes the legitimate use of force and American abstention from the International Criminal Court.[3] Also, U.S. refusal to sign the Anti-Ballistic Missile (ABM) and Kyoto Treaties, U.S. treatment of prisoners in the Global War on Terror (GWOT), the European Union arms embargo on China, and trade disputes involving Microsoft and Boeing continue to add to negative views of the

[2] See Reginald Dale and Robin Niblett, "2006 Will Provide Clues to Europe's Future," Euro-Focus, *Center for Strategic and International Studies* 12 (April 2006): 7, as well as *The National Security Strategy of the United States of America* (Washington D.C.: The White House, 2002) and *A Secure Europe in a Better World: European Security Strategy* of December 2003.

[3] See Robert Kagan, *Of Paradise and Power: America and Europe in the New World Order* (New York: Random House, 2003), Timothy Garten Ash, *Free World: America, Europe, and the surprising future of the West* (New York: Random House, 2004) and Tod Lindberg, *Beyond Paradise and Power: Europe, America, and the future of a troubled partnership* (New York: Routledge, 2005). These works offer analyses of differing views on the use of force, legitimacy, and contemporary disagreements over the future of the U.S./Europe relationship.

U.S. in Europe.[4] Several polls undertaken in Europe in 2004 and 2005 indicate no amelioration of public opinion toward the United States despite recent efforts to improve relations; some have shown perhaps further deterioration in relations in 2006.[5]

A key concept in transatlantic relations involves nations' perception of threats to themselves and their values, and the manner in which these threats are met.[6] Numerous views maintain that the future of transatlantic military cooperation will involve the U.S. as the leader militarily with European forces focusing mainly on the lower ends of the "Petersberg Tasks" of peacekeeping, search and rescue, and peace enforcement.[7] European air forces continue to maintain capabilities relative to the United States, however, and this works examines future intentions to do the same through acquisition policy of combat aircraft.

The rift over the Iraq War in 2003 led some to question the value of alliances in the modern world. Certain views maintained that the absence of a common threat to the European continent freed Europe and the U.S. to go separate ways, prompting Charles Krauthammer to write: "At root, it is a matter of interests. Interests diverge. No use wailing about it. The grand alliances are dead. With a few trusted friends, America must carry on alone."[8] The Bush Administration was widely criticized in Europe for its "coalitions of the willing" policy toward Iraq and Afghanistan, and its supposed abandonment of multilateralism to avoid the encumbrances of allies.[9] Other viewpoints

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[4] Kristin Archick, *The United States and Europe: Possible Options for U.S. Policy* (Washington D.C.: Congressional Reporting Service, Report #RL32577, 23 January 2006), 2. See also Joseph Quinlan, *Drifting Apart or Growing Together? The Primacy of Transatlantic Economy*, Center for Transatlantic Relations, Johns Hopkins University, 2003.

[5] See surveys: "Transatlantic Trends: Key Findings 2005," *German Marshall Fund*, 7 September 2005, http://www.transatlantictrends.org/doc/TTKeyFindings2005.pdf (accessed November 2005) and "America's Image Slips, But Allies Share U.S. Concerns Over Iran, Hamas," *Pew Global Attitudes Project*, 13 June 2006, http://www.pewglobal.org (accessed December 2006).

[6] Dale and Niblett, 7.

[7] See Kagan, *Of Paradise and Power*, Ash, *Free World* and Lindberg, *Beyond Paradise and Power*.

[8] Charles Krauthammer, "Who Needs Allies: Now they are neutrals. America can stand tall without them," *Time International*, 26 January 2004, 40. See also Ivo H. Daalder and James M. Lindsay, *America Unbound: The Bush Revolution in Foreign Policy* (Washington D.C.: Brookings Institution Press, 2003) for a description of the Bush Administration's "hegemonist" foreign policy and disdain of America's allies.

[9] See Miles Kahler, "Multilateralism with Small and Large Numbers," *International Organization* 46 (Summer 1992): 681-708 for a discussion of "minilateralism" and this concept of coalitions of the willing before it was known as such.

purvey the amplified importance of alliances following the events of 2003 by reasons of increased interconnectivity in the global security environment. Alliances are more necessary than before, according to this view, due in part to economic and transnational issues that play greater roles in providing for a nation's security. This is in addition to traditional views on collective defense and the "an attack on one is an attack on all" mindset of before, which remains viable today.[10] This thesis will focus primarily on the military advantages of having alliance partners, and the importance placed upon it by European nations in relation to the United States. To be sure, the political framework will also be kept in mind.

2. Trends in European Defense

The rising potential of the European Union and its European Security and Defense Policy (ESDP) wield some influence over the current mindset of European powers toward defense and procurement policy. Some views would have the EU's defense arm becoming so influential as to defacto replace NATO as the primary military force on the European continent. Proponents of ESDP maintain that since the EU is much more than a military organization, many prefer to exert influence with its "soft power" over NATO's U.S.-led military power. This would logically lead to greater European defense autonomy and decreased American influence in NATO and thus in Europe.[11] Alternate points of view maintain that NATO remains *the* military power in the North Atlantic Area and both sides of the Atlantic must keep this as the underlying tenet of strong transatlantic defense cooperation. Frances G. Burwell and his co-authors point to the negative influence of certain U.S. policymakers' views on the EU as a threat to America and its influence in NATO; likewise EU policymakers' outlook on NATO as primarily a U.S.-dominated organization is unhealthy for transatlantic defense relations. They recommend the U.S. not fear autonomous EU action and even consider contributing needed assets such as

10 Elizabeth Sherwood-Randall, *Alliances and American National Security* (Carlisle, PA: Strategic Studies Institute, 2006). See also Stephen M. Walt, *The Origins of Alliances* (Ithaca: Cornell University Press, 1987) for a comprehensive look at rationale for alliances that remains valid today.

11 Leo A. Michel, *NATO-EU-United States: Why not a virtuous 'ménage à trois'?* (Washington D.C.: Institute for National Strategic Studies, National Defense University, 2006). See also Kristin Archick, *The United States and Europe: Possible Options for U.S. Policy* (Washington D.C.: Congressional Research Service, Report #RL32577, 23 January 2006) and *Chaillot Paper no. 87: EU Security and Defense Core Documents 2005* (Paris: Institute for Strategic Studies, European Union, March 2006).

airlift and C4ISR (Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance) platforms to EU missions. At the same time, the EU should cease fearing NATO as a U.S. tool and abandon the idea that ESDP could replace NATO. They maintain that NATO must remain *the* military power in the North Atlantic Area and the major transatlantic link.[12] This study seeks insight into European leaders' rationale toward greater defense integration, which might be reflected in their rationale toward the Joint Strike Fighter. The quest for autonomy, while difficult to weigh, has to be kept in mind as a background condition for defense procurement decisions.

3. Trends within NATO

a. Consensus Rule and Coalition Warfare

Declaratory policy typically espouses the health of the Atlantic Alliance at an all-time high, and currently this is no different. Numerous NATO press releases and documents indicate the health of the Alliance has never been better. Secretary General Jaap de Hoop Scheffer affirmed in April of 2006 that President Bush's visit in February of 2005 mended the rifts in the Alliance over the Iraq War, and NATO has since moved on to act unanimously as a coalition of 26 countries in both Iraq and Afghanistan.[13] Recent statements hint that the Alliance may be reanalyzing the concept of consensus rule, perhaps symbolizing a permanent departure from unwavering cohesion in military operations. NATO's Comprehensive Political Guidance from the Riga Summit of November 2006 offers a hint as to how it will view cohesion in future coalition operations:

12 Frances G. Burwell, David C. Gompert, Leslie S. Lebl, Jan M. Lodal, and Walter B. Slocombe, *Transatlantic Transformation: Building a NATO-EU Security Architecture* (Washington D.C.: The Atlantic Council, 2005), 20-23.

13 "Beyond the North Atlantic," *National Journal*, 8 April 2006.

> The Alliance will remain ready, on a *case-by-case basis* and by consensus, to contribute to effective conflict prevention and to engage actively in crisis management, including through non-Article 5 crisis response operations, as set out in the Strategic Concept.[14]

Recent coalition operations highlight the operational capability and cohesiveness of NATO as a military organization. Perhaps the best measure of the current state of the Alliance lies in the ongoing operations in Afghanistan, the U.S.-led Operation Enduring Freedom (OEF) and the NATO-led International Security Assistance Force (ISAF). Particularly in ISAF, political and operational problems in the Alliance are highlighted, but the corresponding "work-arounds" and solutions imply that NATO can operate effectively albeit not at the full potential offered with more evenly distributed capabilities and improved interoperability.[15] Though it exhibits the important operational issues affecting cohesion in the Alliance today, Afghanistan does not tell the full story of the direction NATO is following for the future. Long term issues of contention in the Alliance still remain as well, to include burden sharing, levels of defense spending, and most importantly the capabilities gap between U.S. forces and their European counterparts.

b. Capabilities Gap

There exists an abundance of literature on the "capabilities gap" between the U.S. and its European allies, which was highlighted following the 1999 Operation Allied Force (OAF) in Kosovo and continues to be an issue in ongoing operations in Afghanistan. Failure of European air forces to modernize equipment combined with the "Revolution in Military Affairs" (RMA) in the U.S. led to serious interoperability problems with U.S. forces in OAF and forced the U.S. Air Force to bear the brunt of the sorties while the Europeans stood somewhat helplessly on the sidelines. This prompted numerous studies on the issue and was the impetus for NATO's Prague Capabilities Commitment of 2002 and the push for greater capability in the emerging ESDP.[16] The

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[14] *Comprehensive Political Guidance: Endorsed by NATO Heads of State and Government on 29 November 2006*, NATO Online Library, http://www.nato.int/docu/basictxt/b061129e.htm (accessed December 2006). (Italics added by author).

15 Paul Gallis, *NATO in Afghanistan: A Test of the Transatlantic Alliance* (Washington D.C.: Congressional Research Service, Report #RL 33627, 22 August 2006).

RAND Corporation performed a study in 2004 concerning the interoperability of NATO air forces and concluded that coalition warfare will require interoperability at all levels of warfare and national interaction in the future.[17] This study included little data from OAF and deserves revising in the light of lessons learned in Kosovo, improvements undertaken in the ensuing years by European air forces, and the status of those improvements in regards to interoperability in ISAF.

A large part of the literature available concerning the military capability gap focuses on defense spending. Many scholars and analysts have asserted that European countries have spent considerably less than the U.S. on defense for some time, but their lack of robust investment in research and development (R and D) has chiefly contributed to the capabilities gap, and unless a significant increase in the R and D budget is undertaken, this gap will continue to widen.[18] A unique theory is offered by Sorin Lungu, inviting the reader to wonder if the U.S. deliberately chose to aggressively pursue technological advances in military equipment at the end of the Cold War in order to widen the capabilities gap and increase its influence over Europe in military affairs and corresponding defense industrial bases.[19] Jack Sine argues that the U.S. pursuance of technology in its Revolution in Military Affairs serves to distance it from its allies and is incompatible with parallel policies advocating multilateral cooperation in defense matters.[20] These approaches to the issue of the capabilities gap fail to look at attempts to share R and D funding and to pursue common equipment that will put both sides of the Atlantic at the forefront of technology. The Joint Strike Fighter will serve both purposes

16 A portion of these studies includes: Benjamin S. Lambeth, *NATO's Air War for Kosovo: Strategic and Operational Assessment* (Santa Monica: Rand Corporation, 2001), *Kosovo/Operation Allied Force After-Action Report: Report to Congress* (Washington D.C.: Department of Defense, 2000), and Paul Gallis, *Kosovo: Lessons Learned from Operation Allied Force* (Washington, D.C.: Congressional Research Service, Report #RL30374, 14 November 1999).

17 Eric Larson, Gustav Lindstrom, Myron Hura, Ke Gardiner, Jim Keffer, and Bill Little, *The Interoperability of NATO Allied Air Forces: Supporting Case Studies* (Santa Monica: Rand Corporation, 2004), x-xiv.

18 David C. Gompert, Richard L. Kugler, and Martin C. Libicki, *Mind the Gap: Promoting a Transatlantic Revolution in Military Affairs* (Washington D.C.: National Defense University Press, 1999).

19 Sorin Longu, "European Perceptions of U.S. High-Technology and Defense Strategies since the Final Days of the Cold War: A Sine Qua Non Research Agenda?" *Strategic Insights* IV, Issue 6 (June 2005).

20 Jack L. Sine II, "Organizing the Fight: Technological Determinants of Coalition Command and Control and Combat Operations" (Master's Thesis, Naval Postgraduate School, 2006).

and warrants reconsideration of the capabilities gap matter. This thesis examines the JSF as insight into European thinking toward matching U.S. efforts to improve military capacities through technology.

4. Transatlantic Trends in Defense Procurement

The history of procurement policies in NATO is closely tied to political initiatives and the health of defense industries in the U.S. and Europe. Chapter 2 of this manuscript examines the historical record of cooperative defense projects and their relation to the defense industrial bases in the U.S. and Europe. The decade following the end of the Cold War saw the merging of numerous defense firms in the U.S. followed by the same in Europe but at a slower rate due to industry protection and national economic interests hindering the progress. In 2006, several views exist as to the future of defense industrial bases in NATO nations. Terrence R. Guay in his 2005 manuscript for the U.S. Army War College entitled "The Transatlantic Defense Industrial Base: Restructuring Scenarios and their Implications" maintains that a "bipolar" defense industrial base is a distinct possibility between the U.S. and Europe, due to increased integration and attempts to block American defense business form the continent. He recommends increased cooperation between government, industry and militaries to create a true transatlantic defense industrial base.[21]

Certain European views still hold that a defense industrial base independent of the U.S. is the best option for integrating defense industries, and is best for the long-term health of defense industries in Europe. The rising influence of the ESDP led to the creation of a European Defense Agency (EDA) which now lobbies for a European Defense and Equipment Market (EDEM), essentially a fully autonomous defense industrial base.[22] The EU recently passed a "Code of Conduct" to attempt to open up intra-European competition for defense contracts and move away from "national

[21] Terrence R. Guay, The *Transatlantic Industrial Base: Restructuring Scenarios and their Implications* (Carlile, PA: Strategic Studies Institute, 2005).

[22] Burkard Schmitt, *Defense Procurement in the European Union: The Current Debate* (Paris: Institute for Strategic Studies, European Union, 2005), 5.

champions" that are protected by governments.[23] However, many analysts agree that further transatlantic cooperation is not only inevitable but best for both sides of the Atlantic. Some recommend a "country cluster" approach to optimize the niche capabilities of smaller firms and help those nations with less than a complete defense industrial base. Those who support further transatlantic cooperation point to the Joint Strike Fighter as the paradigm program in this approach.[24]

This study treats the F-16 sale to four European nations in 1975 as an example of the positive results capable in transatlantic cooperative ventures. Chapter 3 presents a case study which outlines the specific merits of the program from a European perspective, and why a similar program which allows further cooperative work in design and manufacturing has added value for both the U.S. and Europe in 2006. The JSF is analyzed as that program, and applied to the current state of cooperation in defense industrial bases.[25]

C. IS THE JOINT STRIKE FIGHTER THE ANSWER?

As transatlantic cooperation is opening up among defense industries, this thesis argues that European countries should at least be considering the JSF for their next tactical aircraft. There are European aircraft alternatives available such as the Eurofighter, the French-made Dassault Rafael, and the Saab Gripen from Sweden. Not surprisingly, arguments abound as to why each aircraft is better than the others and should be purchased by all interested. Vance Coffman, then CEO of Lockheed Martin,

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23 *The Code of Best Practice in the Supply Chain, European Union Document* (European Defense Agency, 2006).

24 See Richard A. Bitzinger, "The Globalization of the arms industry: The next proliferation challenge," *International Security* 19, (Fall 1994): 171, and See Phillip Taylor, "Weapons Standardization in NATO: Collaborative Security or Economic Competition?" *International Organization*, Winter 1982 for views advocating transatlantic cooperation. Michèle A. Flournoy, Julianne Smith, Guy Ben-Ari, Kathleen McInnis, David Scruggs, *European Defense Integration: Bridging the Gap between Strategy and Capabilities* (Washington D.C.: Center for Strategic and International Studies, 2005) is a comprehensive work on European defense industries and recommends the "country cluster" approach. See also Guay, *The Transatlantic Industrial Base* for an excellent overview of transatlantic issues in defense industries.

25 See Ingemar Dorfer, *Arms Deal: The Selling of the F-16* (New York: Praeger Publishers, 1983) for an excellent overview of the transatlantic situation during the F-16 deal and Ann Markusen, "The Rise of World Weapons," *Foreign Policy* 114, (Spring 1999): 40-51 for an example of views advocating the Joint Strike Fighter as the follow-on to the success built in the F-16 program and for the health of industrial bases in both the U.S. and Europe.

told Defense Daily in 2001 that the influence the U.S. gained with the F-16 program should be exploited to ensure the sale of the JSF to our allies. As he said: "If we choose to turn away from that market, we will have made a major decision in terms of U.S. international trade and cooperation with our allies. They will find another product somewhere, all of them. It won't be a product that is as well integrated as the F-16 has become around the world, and it won't be a product that has the capability as the JSF."[26] The Gripen is billed as a lightweight 4th-generation fighter not able to match the JSF (a 5th-generation aircraft, explained in detail in Chapter 3) in capability but likely much cheaper.[27] The Eurofighter is generally accepted to be 4th-generation and geared toward counter-air roles while being somewhat overpriced compared to the JSF.[28] The French Rafale has seen trouble with export sales due to its heretofore absence in the French Air Force until recently, and is widely viewed as "too French" to be palpable to other air forces.[29] While it is difficult to objectively measure one aircraft against another, especially given the fluid and ever-changing environment of determining per-aircraft costs, Defense-Aerospace.com issued a first-rate report in July 2006 explaining what is entailed in cost figures. They rank the fighters currently available on the market by price, and explain methodology and different manners of arriving at numbers offered by governments and manufacturers.[30]

1. JSF Program

A Congressional Research Report dated 2 June 2006 is an excellent source for the background and issues facing the Joint Strike Fighter program. Additional works which serve to describe the program and its international implications include a July 2003

26 Vago Muradian, "Coffman: JSF Critical to Preserving U.S. Leadership in World Fighter Market," *Defense Daily*, 26 February 2001.

27 "The JAS-39 Gripen: Sweden's 4th Generation Wild Card," *Defense Industry Daily*, 25 August 2006, http://www.defenseindustrydaily.com/2006/08/the-jas39-gripen-swedens-4th-generation-wild-card/index.php (accessed August 2006).

28 "Q & A: What makes the Eurofighter fly?" *BBC News Website*, http://news.bbc.co.uk/2/hi/europe/1818077.stm (accessed July 2006).

29 Christina MacKenzie, "Rafale, the French Fighter, Scrambles for Export Orders," *International Herald Tribune*, 17 July 2006.

30 "Sticker Shock: Estimating the real costs of modern fighter aircraft," *DefenseAerospace.com*, (Defense-aerospace.com document, 12 July 2006).

Government Accountability Office report and a June 2003 Department of Defense Study concerning the international industrial participation aspect of the program.[31] These documents address which countries entered the program at which level, and with different stipulations and requirements for their particular defense industrial bases. They explain how the phases of the program are constructed and investments proffered by different nations to this point. Through this we can clearly see the difference in a program such as the F-16, which was almost exclusively designed and built in the U.S., and the Joint Strike Fighter program, which encompasses international cooperation from program inception. Issues concerning industrial offsets and U.S. desire to further its own defense industrial base are clearly spelled out in these works, with discussions of different grievances aired by the participating countries and their threats of discontinuing the program. An analysis of recent trends can build on these works and will offer insight into European defense policy.

Numerous issues have arisen in partner countries regarding the nature of the JSF program and U.S. domination therein. In February of 2006, the Pentagon announced plans to cancel the UK-produced second engine of the JSF at the same time delays in the aircraft program caused the British Defense Ministry to move forward with new carrier designs without the anticipated new aircraft. This caused a considerable amount of tension between the two countries which was documented in numerous media outlets. Additionally, the General Accounting Office later issued a report faulting the U.S. decision, which was later reversed.[32] The Congressional Research Service assessed the impact of this decision on the program and specifically on the international partners, concluding that greater oversight of the program was needed.[33]

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31 Christopher Bolkom, *F-35 Joint Strike Fighter Program: Background, Status, and Issues* (Washington D.C.: Congressional Research Service, Report #RL30563, 2 June 2006); *Joint Strike Fighter Acquisition: Cooperative Program needs Greater Oversight to Ensure Goals are Met*, (Washington D.C.: General Accounting Office, GAO-03-775, 21 July 2003); *JSF International Participation: A Study of Country Approaches and Financial Impacts on Foreign Suppliers* (Washington D.C.: Department of Defense, Office of the Deputy Undersecretary of Defense for Industrial Policy, June 2003).

32 *Tactical Aircraft: DOD's Cancellation of the Joint Strike Fighter Alternate Engine Program Was Not Based on a Comprehensive Analysis*, (Washington D.C.: General Accounting Office, GAO-06-717R).

33 Christopher Bolkom, *Proposed Termination of Joint Strike Fighter (JSF) F136 Alternate Engine*, (Washington, D.C.: Congressional Research Service, Report #RL33390, 13 April 2006).

Much scrutiny has been brought to the JSF program itself from U.S. governmental organizations, in part due simply to the design of the defense procurement system. The GAO has issued several reports criticizing the business case, especially the plan to commence production of the jet before 1 percent of the flight testing is completed.[34] More relevant to this thesis is a 2003 GAO report detailing the challenges of the JSF international program and recommending greater oversight to ensure the continued support and interest of the partner countries.[35] The House of Representatives held a hearing to discuss the GAO report and the JSF international program, where partner country's reasons for joining the program were discussed. Specifics were also discussed concerning which advantages were offered to countries of different tiers and how technology sharing and the concept of "best value" works in practicality when doling out subcontracts to foreign firms.[36]

2. Participating Countries, Issues, and Abstainers

Numerous newspaper and magazine accounts chronicle the process of different countries signing up for the JSF program and their grievances and problems therein. There is an abundance of articles containing quotes from defense ministers and politicians as the final MOU's were signed in 2002 officially bringing the eight partner countries into the program.[37] These press accounts combined with statements from politicians and defense industry personnel can offer insight into nations' interest in the JSF and their respective future defense postures, as well as the positive potential of the program itself. There are also well-documented instances of problems arising after the signing of the MOU's, most notably with Norway and the UK. These can offer insight

34 *Tactical Aircraft: Recapitalization Goals are not Supported by Knowledge-based F-22A and JSF Business Cases*, (Washington D.C.: General Accounting Office, GAO-06-487T, 16 March 2006) and *Tactical Aircraft: Opportunity to Reduce Risks in the Joint Strike Fighter Program with Different Acquisition Strategy*, (Washington D.C.: General Accounting Office, GAO-05-271, 15 March 2005).

35 *Joint Strike Fighter Acquisition: Cooperative Program needs Greater Oversight to Ensure Goals are Met*, (Washington D.C.: General Accounting Office, GAO-03-775, 21 July 2003).

36 *Is DOD meeting Joint Strike Fighter (JSF) International Cooperative Program Goals?* Hearing before the subcommittee on national security, emerging threats, and international relations, 108th Congress First Session, (Washington D.C.: U.S. Government Printing Office, 2003).

37 In 2002, Australia, Canada, Denmark, Italy, the Netherlands, Norway, Turkey, and the United Kingdom joined the System Design and Development phase of the Joint Strike Fighter program along with the United States.

into shortcomings of the program as it is currently handled, and possible near-term solutions. One sparse area in the literature concerns the reasons why certain countries have abstained from the program to date. A study of domestic politics and declared policy in these nations will shed light on the rationale at hand, but locating the actual reasoning is a challenge. Weighing the factors as they play on government decision-makers is perhaps most difficult.

D. METHODOLOGY

The methodology for conducting this project is a simple case study of selected countries participating in the Joint Strike Fighter program. The European countries that are involved in the JSF are examined as well as the key European nations operating the F-16 that have abstained from the program. Focus is on the original four European Participating Air Force (EPAF) F-16 members: Belgium, Denmark, the Netherlands, and Norway in order to establish the constant of previous experience operating American equipment in an organized consortium which shares tactics, logistics, and other operationally important concepts. Interviews with national representatives of Denmark, the Netherlands, and Norway to the JSF program office were conducted to provide insight. Also, numerous interviews with Belgian military and industry representatives combined with the author's experience in the Belgian Air Force provided great insight into rationale present in this country. The United Kingdom, as the sole Tier 1 partner, offers a view into the structure of the program and some established problems therein are best explained through the UK lens. The Dependent Variable is a country's decision to purchase the aircraft, and independent variables explain influencing factors such as the planned purchase of a similar aircraft, economic issues, current political relations with the Untied States, relative size of the country, grievances with the JSF program and its perceived need for a 5^{th} generation fighter. Intervening variables are addressed as well, such as domestic political issues within the countries, industry's role, and transatlantic relations. Several assumptions will need to be established before addressing the list of variables. For example, a brief discussion of the JSF capabilities will argue that in fact it is superior in capability to other options such as the Eurofighter and Gripen, thus eliminating the question of whether decision-makers are opting for a better aircraft.

In seeking answers to the status of the capabilities gap and European views on alliance warfare with the United States in the 21st century, a study of the Joint Strike Fighter will offer great insight as both the paradigm cooperative defense venture and most capable combat aircraft available to European nations with regards to technology and interoperability. To arrive at the current rationale for procuring fighter aircraft in Europe, an historical perspective is necessary to frame the contemporary state of affairs. This will be undertaken in two timeframes, and we begin with a study of transatlantic defense procurement following World War Two.

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II. INFLUENCES AFFECTING EUROPEAN FIGHTER AIRCRAFT PROCUREMENT DURING THE COLD WAR

The procurement of military hardware signifies a complicated process with implications of utmost importance for a nation's security and the political livelihood of those figures in uniform and mufti who make such choices.[38] The factors involved in the decision making process for defense procurement fall into three general categories: 1) **Political Influences** (from such external sources as alliances and other countries as well as domestic politics), 2) **Defense Industrial Bases** and their respective vitality and capacity and 3) **Military Influence** that a state requires and/or desires. Of course, these categories are not mutually exclusive and in fact interact quite dynamically in the process of making major purchases for the purpose of a country's defense. Nation-states understandably prefer to produce their arms autonomously, though this policy is possible only with adequate technological know-how and corresponding industrial capacity. The next most desirous choice is to co-*develop* their arms with other countries, thus to act as equal partners while sharing the technology and costs beginning in the initial design stages of a program. Co-*production* of weapons is a state's next choice, which allows some degree of industrial participation but without the corresponding influence afforded by the "equal partner" approach. Lastly, the simple importation of weapons "off the shelf" allows a nation-state to fulfill its military needs, but with little chance to influence the capability of the system and no corresponding industrial benefits (See Figure 1).[39]

This chapter begins with a historical study of defense procurement in Western Europe during the Cold War, focusing on fighter aircraft and the relative weight of the three aforementioned categories. These factors influenced nation-states in different ways but throw into clear light the dynamics present in the decisions to procure Europe's

[38] Scholarly works of interest to this question that focus on case studies of U.S. forces in the cold war: Desmond Ball, *Politics and Force Levels* (Berkeley: University of Calif. Press, 1980); Frederic Bergerson, *The Army Gets an Air Force* (Baltimore: Johns Hopkins University Press, 1980); Michael Brown, *Flying Blind: the Politics of the U.S. Strategic Bomber Program* (Ithaca and London: Cornell University Press, 1992).

[39] Ethan B. Kapstein, "International Collaboration in Armaments Production: A Second Best Solution," *Political Science Quarterly* 106, No. 4 (1991-1992): 660.

combat aircraft. The section finishes with a case study of the F-16 purchase by four European countries in 1975 to further analyze the factors in actual experience versus the grey realm of scholarly theory.

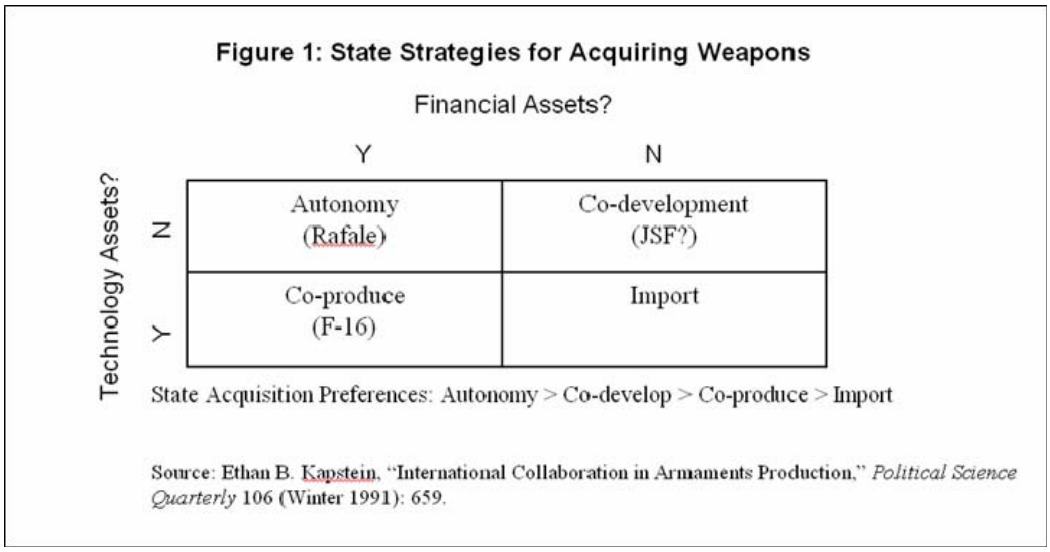

Figure 1. State Strategies for Acquiring Weapons.

The weight of U.S. power in the air of the decade of the late-1940s and early-1950s implies that a scholarly comparison with the aviation world of a half century ago and that of today underscores significant discontinuities. Then the U.S. had an unchallenged predominance of economic might and technological finesse.[40] Nonetheless, the NATO allies began their defense procurement behavior and policy in this very period, and as such this era forms the foundation for any understanding of the topic at hand. The Western Europeans faced the dilemma of guns and butter amid the need to build up the defense of the West on the devastated post-war societies and economies of 1948/9. Thus, the immediate call for relief by the demoralized domestic populations which led to the European Recovery Program of 1947 blended with pressure from the United States and the nascent North Atlantic Treaty Organization to build up militaries to counter the

[40] One should note that much of U.S. progress in aviation had come, in part, at the expense of the defeated Germans. See John Farquharson, "Governed or exploited? The British Acquisition of German Technology, 1945-1948," *Journal of Contemporary History* 32 (January 1997): 33-42 and Takashi Nishiyama, "Cross-Disciplinary Technology Transfer in Trans-world War II Japan," *Comparative Technology Transfer and Society* 1 (December 2003): 316.

Soviet threat in 1950.[41] The defense industrial bases of the Western European NATO allies at the time were nearly nonexistent on the continent, and when rearmament commenced in the Korean War most countries were obliged to turn to U.S. material while relying on the American umbrella (both conventional and nuclear) and the collective defense offered by NATO. Military capability was quickly recognized as a priority in the face of the Soviet buildup in the East, but when faced with difficult budget decisions and a decimated public, most governments realized "priority" to be a relative term. Once the economies and societies of Western Europe had rebounded from the nadir of the post war years, in the early-1960s, did the nation-states of Western Europe proceed to a stance on defense procurement of partners more than supplicants. It was then that defense industrial bases and desired military capabilities entered the mix with political factors, and the former began to interact with the latter to shape the defense posture on the continent.

A. POLITICAL INFLUENCE

The years following the end of the Second World War, that is, 1945 until 1960, witnessed a commonality in domestic political factors in Western Europe which influenced national decisions to buy weapons. Western European industry was devastated and recovery focused on the civilian sector, while the general public was much more concerned with jobs and basic subsistence than with military forces. The issue of autonomous defense capability was not at the forefront of the public's concerns, especially when one considered that the United States provided the bulk of the equipment to counter the Soviet threat. Most military equipment which found its way to Europe through the early 1950's was part of the American Mutual Defense Assistance Act of 1949 and the Mutual Security Acts of the 1950's, which in effect removed the issue of defense procurement from public concern (and thus politicians' agendas) for some time.[42] Until the recovery of European defense industries in the 1960s, most political

[41] Ian Q.R. Thomas, *The Promise of Alliance: NATO and the Political Imagination* (Lantham: Rowan and Littlefield, 1997). See also Thies, 22-29.

[42] Philip Taylor, "Weapons Standardization in NATO: Collaborative Security or Economic Competition?" *International Security* 36, No. 1 (Winter 1982): 99. See also Thies, 64-65.

influence on governments' defense-related purchases came from within NATO itself and in effect what is called the cascading of weapons from the richer NATO powers to those less endowed.

Initially, the Alliance considered weapons standardization the most important issue for national governments to address after defense spending. The standardization of weapons within the Alliance brought advantages from several important aspects, a point realized by NATO's decision-makers in the 1950s. Operating the same equipment as one's allies not only offered a multitude of interoperability benefits, it also greatly simplified the issue of finding spare parts during wartime. The aim of such NATO agencies as the Military Agency for Standardization (formed in 1951) was to realize not only the operational benefits but also the commercial advantages of operating the same equipment.[43] The economic advantages of mutual R and D funding and common production lines, or "rationalizing" arms production, had the adverse effect of reinforcing the reluctance of member states to increase their defense budgets. NATO as an organization therefore promoted RSI (Rationalization, Standardization, and Interoperability) in weapons procurement to lower unit costs and increase the amount of equipment available to purchase for a given sum.[44] However, despite years of promoting RSI, factors such as economic issues, national protection of defense industrial bases, and political issues present in consensus decision-making limited the number of times the Alliance attempted to develop and purchase a common weapons system. A common fighter program was never attempted, and the NATO AWACS serves to demonstrate the reasons for this fact.

NATO's only successful example of an alliance-wide defense acquisition is that of its Airborne Warning and Control System (AWACS) fleet. The program nonetheless demonstrates the complex political and nearly impossible political and economic obstacles to be surmounted in such an endeavor. A study in 1970 unexpectedly determined that Soviet aircraft were capable of flying under the existing air defense structure, identifying the critical need for airborne surveillance to prevent a sneak attack

43 *NATO: The First Five Years, 1949-1954* (Paris: North Atlantic Treaty Organization, 1954), 125.

44 Wallace J. Thies, *Friendly Rivals: Bargaining and Burden-shifting in NATO* (Armonk: M.E. Sharpe, 2003), 15, 111.

from the east. NATO's defense ministers quickly professed the requirement for such a system, soon agreeing that unilateral or semi-cooperative programs were not feasible given the large budgetary constraints. Since all countries urgently needed the aircraft and no viable option existed in the European defense industries, the only logical solution was an alliance-wide purchase of the U.S.-made Boeing E-3 AWACS.[45] But the political and economic realities of who would pay for what and when soon proved that a collectively owned and operated asset would be no easy task. Years of negotiations preceded the agreement to finally purchase the 18 aircraft, with numerous political and economic issues surfacing throughout.[46]

The British logically preferred their aircraft (The Nimrod anti-submarine patrol plane based on the Comet transport of the 1950s) and pulled out of the program, only to eventually purchase what became the Boeing E-3C through a different program years later. France predictably avoided commitment to a non-French product while still keeping its cards on the table, but in the end did not take part in the NATO program.[47] Germany struggled with significant defense budget problems, a reluctant parliament, and newly-elected left of center politicians unwilling to spend their political capital on such a large purchase. Belgium and Portugal faced either unstable or fallen governments with interim ministers who remained powerless to take decisions for several years. Italy's defense minister was reluctant to ask his generals for approval as his predecessor awaited jail time for a large bribery scandal involving U.S. aircraft several years before. Greece and Turkey became logical special-needs cases with their unique demands vis-à-vis their underlying dispute. And all countries haggled over fiscal matters such as percentage shares, payment schedules (all wanted to pay later) and industrial offsets. In the end, the program was approved with Luxembourg the only partner endorsing the purchase with unwavering support and no special stipulations or concessions.[48]

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45 Note: The British Nimrod aircraft was also considered but quickly voted down by all except the British.

46 Arnold Lee Tessmer, *Politics of Compromise: NATO and AWACS* (Washington D.C.: National Defense University Press, 1988), 3.

47 Note: Ironically, the French also purchased the Boeing aircraft years later on their own after several failed attempts within their own industry. This followed the French use of the KC-135 for the Force de Frappe, another Boeing aircraft of far simpler technological finesse than the AWACS.

48 Tessmer, *Politics of Compromise: NATO and AWACS*, 49.

But despite its unlikely success, the AWACS program proved why alliance-wide purchases have been the exception rather than the rule, and virtually impossible for the purchase of fighter aircraft. First, the program of the early- and mid-1970s was unique in that all countries could agree (rather quickly) on a common and urgent requirement with minimal haggling over details. The strategic situation of the time as well as the willingness in NATO to shoulder more of the conventional military burden had increased steadily as the U.S. was, itself, recovering from the Vietnam War. Secondly, there was no bargaining over who would produce which part of the aircraft to benefit national aerospace industries. The program was already underway in the United States for the USAF, but lacked support and funding, essentially an "aircraft looking for a mission,"[49] and this combined with its urgent requirement precluded any time-consuming bartering over industrial offsets. The American firm Boeing held a virtual monopoly over NATO's options in this case, which greatly simplified the process.

In sum, in its first decades, NATO attempted to pressure its member states to procure common equipment, but in the end, this proved impossible, especially for fighter jets. NATO remained a consultative organization in this sense, advising on procurement issues, but unwilling and unable to dictate military requirements within the context of consensus rule. The Alliance embarked on a wholly different course, as befitted such a diverse organization with widely different ideas about arms and industrial policy. Several other alliance-wide projects were attempted, but the lack of both urgent need and manufacturing monopolies resulted in program failures.[50] National decision-makers certainly listened to the demands of the Alliance, but other factors rapidly entered the foray. The revival of European economies soon rendered collaborative defense projects (rather than alliance-wide commitments) much more viable and transatlantic and Alliance issues took a back seat to resurgent defense industrial bases.

[49] Tessmer, 3.

[50] Examples included the HAWK missile, common tank treads, and the NATO Frigate. See Taylor, "Weapons Standardization in NATO," 99.

B. DEFENSE INDUSTRIAL BASES

The resurgence of European defense industries interacted with events in the United States during the 1960's, 70's and 80's to shape the state of transatlantic defense procurement in the early-21st century. While the perceived level of the Soviet threat waxed and waned, common security goals and NATO's RSI aspirations remained a constant feature of how the Alliance functioned. However, the U.S. desire for defense industry dominance collided with Europe's need for autonomy in the same to create an unpleasant undertone in transatlantic relations during this period. In particular, the manner in which the U.S. had shifted the defense burden by neo-mercantilist offset agreements or the blind imposition of weapons was bound to promote a backlash, especially as a European aerospace industry found its wings in the 1970s and 1980s. This power struggle would play itself out in the realm of fighter aircraft production and sales, with some degree of stabilization seen as the Cold War ended.

When the Kennedy administration came to power in 1961, budget constraints and economic pragmatism steered the U.S. policy on European defense away from merely doling out aid and toward the selling of American equipment to its allies. The Eisenhower administration had struggled with the economic burdens of stationing U.S. forces in Europe amid the growth of the western European economies, and this became a source of domestic political friction inherited by the Kennedy administration.[51] Economic recovery on the continent had allowed European countries to start providing more for their own defense, and the U.S. defense industry would stand to gain from these purchases. It seemed to the U.S. a fair compromise to sell American products but allow some degree of production overseas, exemplified in such programs as the F-104G, which is discussed later. Certain wary NATO partners, however, felt such programs would only serve to increase U.S. influence.[52] In addition, Europeans feared the U.S. was exploiting their relative size advantage through NATO, in essence calling for further standardization of Alliance weapons in order to create more opportunities to sell their products across the Atlantic. This increase in production would subsequently drive the per unit equipment cost down, allowing the U.S. military to purchase more items and accordingly increasing

[51] Hubert Zimmermann, *Money and Security* (Cambridge: Cambridge University Press, 2002), 97.

[52] Taylor, 99.

the pressure on Europe to operate the same equipment.[53] Thus, the rather obtrusive U.S. foot in Europe's door caused European governments to fear an American technological monopoly and led to cries for autonomy in their defense industries.

The initial response was for the larger countries to protect their "national champions" in defense industries, but they soon realized that national autonomy in this realm would mean certain doom for their industries.[54] In 1968, the formation of Eurogroup began the consolidation of European defense industries,[55] but it stalled without French industrial participation. The Independent European Program Group (IEPG) of 1976 included the French and represented Europe's first collective effort to stand up to U.S. defense industrial hegemony.[56] Though Europe clearly lacked the technological competence to match the U.S. at the time, Eurogroup and IEPG served as a warning across the Atlantic that the days of American dominance were numbered in the 1970s. U.S. Secretary of Defense James Schlesinger feared a "Euro-cartel" and consequently promoted the concept of the "two-way street" to open up transatlantic defense markets.[57] Critics of the two-way street argued that while it would be advantageous for Europe to continue buying American defense products, it was unrealistic to expect the U.S. to buy any significant amount of European hardware. Mechanical problems with the British Harrier jet operated by the U.S. Marines at the time pointed to the operational disadvantage of dependence on foreign military equipment.[58] Thus, the stakes of the aerospace Alliance procurement game were clearly changing for both sides. Europe was willing but unable to go it alone and the U.S. was realizing that competitive R and D and competitive production was driving away its European allies. A compromise was needed but the two-way street didn't seem to offer the solution.

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[53] Thies, 139.

[54] Taylor, 99-100. Note: France protected its industry much longer than other countries, a factor that today is perhaps limiting the export capability of its newest fighter aircraft, the Rafale.

[55] NOTE: Eurogroup involved more extensive tasks than managing defense industries to be sure, and acted as a political consultation forum for European members of NATO. Thanks to Rafale Biermann for bringing this to the author's attention.

[56] Kapstein, "International Collaboration in Armaments Production: A Second Best Solution," 663.

[57] Ibid., 664.

[58] Eliot Cohen, "NATO Standardization: The Perils of Common Sense," *Foreign Policy* 31 (Summer 1978): 79.

In 1983, David Abshire left his position as president of the Center for International and Strategic Studies to serve as President Reagan's U.S. Permanent Representative to the North Atlantic Council. There he took the unprecedented step to promote defense collaboration as an American policy, in essence coalescing defense industrial issues with those political-military in nature. Surely such was a reflection of the Cold War tensions of the year 1983, but the implications for the subject were compelling. This policy eventually led to the celebrated Nunn Amendment, of Sam Nunn, Democratic Senator from Georgia, whose expertise in NATO was a central feature of U.S. transatlantic policy from the 1970s until the 1990s. The law required U.S. defense firms to seek collaboration and interoperability with its allies. This demarche seemed at least on paper to end the power struggle between American and European defense industries.[59] Ethan Kapstein summed up the Nunn Amendment from the U.S perspective:

> The Nunn Amendment provides several incentives to American defense firms to ensure their participation in collaborative co-development. First, it offers a pool of research funds for cash-starved defense industries, so long as they collaborate in weapons R and D. Second, by promoting collaboration, the amendment helps maintain access for U.S. defense firms to the European market, it advances RSI, and it encourages the spread of economic and technological risks inherent in weapons development. Finally, by subsidizing research, it reduces the upfront expenditures that companies must commit to a new weapons program. In sum, the amendment appears to serve prominent state and industry objectives.[60]

Decision-makers on both sides of the Atlantic were pleased, as the machinery was in place to prevent the need to choose in the future between the pressures of Alliance RSI and the health of their own defense industrial bases. The historic compromise pointed to the birth of true transatlantic defense industrial collaboration.

What effect did the Nunn Amendment have on fighter procurement in Europe? Initially, results were scarce. NATO developed the Conventional Armament Planning System (CAPS) in 1987 which attempted to "highlight NATO equipment deficiencies, and provide coordinated guidance and comparisons for national armament planners on

[59] Kapstein, "International Collaboration in Armaments Production: A Second Best Solution," 666-667.

[60] Ibid., 670.

short-, medium- and long-term requirements."[61] However, as is often the case in the purchase of fighter aircraft, their relative portion of respective defense budgets and the involvement of national industry rendered the process too cumbersome and too political to be guided by NATO military authorities. Instead, it was still the defense industrial bases that remained most influential in the decisions for fighter purchases up to the end of the Cold War. The following examples of Europe's fighter aircraft programs during the period 1960-1989 serve to illustrate the point.

U.S. technological foothold in Europe commenced with the Republic F-84 fighter bomber in the early 1950s and was augmented yet further in the same decade with the Lockheed F-104G Starfighter. The Lockheed plane owed its existence to lessons learned in the Korean War, and the original F-104A was designed as a light-weight interceptor able to climb high and fast to arrive at a dogfight quickly and advantageously. However, it was among the first of the Mach 2 fighter aircraft of the 1950s and suffered from teething problems. Its high performance, limited range and stunted payload restricted the usefulness of the F-104C in the United States Air Force,[62] but the aircraft, redesigned as a fighter bomber, saw extensive export sales. The highly aggressive and effective sales campaign mounted by the Lockheed organization contributed greatly to this export success. Germany, Belgium, the Netherlands, Denmark, Norway (and later Greece, Turkey, and Spain) all augmented their sub-sonic F-84-based tactical air forces at least partially with the Mach II fighter in the 1960's and 70's.[63] The export version was largely a collaborative project, designed in the U.S. but constructed to some degree via offsets in several of the NATO countries. The aircraft also formed an operational means of NATO Massive Retaliation strategy (and later Flexible Response) whereby the fighter bomber was able to carry tactical nuclear weapons and thus share the nuclear role with the

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[61] "Political, Technology Transfer Issues Cloud NATO Cooperation Strategies," *Aviation Week and Space Technology* 29, No. 10, 83.

[62] The aircraft was procured and then discarded from the USAF order of battle in rapid succession, but saw limited service in the Vietnam War.

[63] Jane's All the World's Aircraft, http://www8.Jane's.com.libproxy.nps.navy.mil/Search/documentView.do?docId=/content1/Jane'sdata/yb/jau/jau_1603.htm@currentandpageSelected=Jane'sReferenceandkeyword=F-104andbackPath=http://search.Jane's.com/SearchandProd_Name=JAUand (accessed November 2006). See also Global security website, F-104G Starfighter, http://www.globalsecurity.org/military/systems/aircraft/f-104.htm (accessed October 2006).

continental allies and counteract French nuclear acquisition.[64] This policy afforded the U.S. influence on the continent while also defining the revival of a European fighter production industry. In fact, one theory states that when the U.S. sold Germany the F-104 in a joint project in 1960, it saved the German aerospace industry from ruin, causing concern in France and Britain over the shifting balance of power in continental defense industries.[65] There were mixed reviews on the aircraft performance and safety record, especially in Germany, but the program nonetheless firmly established the U.S. defense aerospace industry on the continent and set the stage for further collaborative fighter projects.[66]

While some countries continued to operate U.S.-made jets, certain European nations turned desire for independence from U.S. industry into several fighter jet projects, beginning with the FIAT G-91 project, through the Harrier and onto the Panavia MRCA/Tornado venture in 1968. Britain, Germany, and Italy teamed with the Netherlands, Belgium, and Canada to pursue a common multi-role fighter while sharing a part of the research and development costs. Canada, the Netherlands and Belgium all withdrew from the program at an early date, citing too many compromises in the aircraft design and burgeoning cost projections as reasons. The remaining three countries wrangled over different conceptions of the aircraft's role for some time, with Germany demanding a Close Air Support aircraft able to loiter over troops on the battlefield and Britain pushing for a fast swept-wing design to fly low and carry large amounts of ordnance. Italy required an air-to-air role which was less important to Germany and Britain. In the end, several versions were built and all suffered losses of capability to

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[64] See *NATO Strategy Documents 1949-1969*, ed. Gregory W. Pedlow (NATO Archives) http://www.nato.int/archives/strategy.htm (accessed November 2006), xv-xx.

[65] Kapstein, "International Collaboration in Armaments Production: A Second Best Solution," 667.

[66] Note: The F-104 was hardly a model aircraft or a model program. Its safety record was abysmal, particularly in Germany where it earned the nickname "The Widowmaker." Of 916 aircraft in service, over 200 crashed, killing 115 pilots including the son of the Defense Minister (a staunch supporter of its safety record). It was later proven that Lockheed had engaged in a widespread practice of bribery to sell the plane in Europe and elsewhere, perhaps necessary given its already questionable record in the U.S. Air Force. Lockheed admitted to paying government officials "under the table" in over 15 countries in connection with the program. See John Eisenhammer, "No tears as the old Widowmaker makes its last flight," *The Independent*, May 23 1991, 14, and "Lockheed ordered to produce documents," *World News Digest*, December 27, 1975, 975 C3. For a further discussion of the F-104G in the FRG and U.S. influence on the FRG Luftwaffe, see Bernd Lemke et al., *Die Luftwaffe, 1950-1970* (Munich: Oldenbourg, 2006), 649.

satisfy the differing requirements of the partner countries.[67] In essence, the Tornado was designed as a bomber to satisfy initial requirements, and later tried to become a fighter to satisfy further needs, which is widely viewed as the worst path to an effective air defense fighter.

The Tornado nevertheless demonstrated that cooperation among the three remaining countries worked despite some divergence in views. The international company Panavia representing the three nations' major aerospace firms conducted management oversight of the program, while the NATO organization NAMMA (NATO Multi-role Combat Aircraft Development and Production Management Agency) provided some governmental control. Industrial contracts were assigned based on percentages of total aircraft purchased, with relatively little disagreement among the partners.[68] At the same time, the Tornado program demonstrated several trends in multinational defense cooperation during this era. For example, The Netherlands and Belgium both left the project after realizing the F-16 program promised not only greater multi-role capability, but better industrial opportunities for their smaller defense industries as well. In this sense, the Tornado program also embodied the split between smaller countries such as these and the larger European defense industrial powers. The limited transfer of technology from the U.S. to European countries in the F-16 program would have been insufficient to sustain the larger defense industries, thus compelling them to pursue their own programs.[69]

By the 1980s, the Tornado enjoyed success throughout Europe, chiefly through multiple upgrade programs. It remained limited in capabilities, though, especially in the air-to-air role. This was due in large part to issues present at the outset of the program: design compromises and the comparative limits of European aerospace technology. Demonstrating the propensity of collaborative partners to continue together in future

[67] William D. Bajusz, "Advanced Technology and Public Policy: Multinational Weapons Acquisition," *Policy Sciences* 11 (1980): 276.

[68] "Panavia Tornado: History and Development," http://www.fighter-planes.com (accessed October 2006).

[69] Bajusz, "Advanced Technology and Public Policy: Multinational Weapons Acquisition," 278.

ventures (an issue addressed further in a later chapter), the same countries with the addition of Spain decided to jointly pursue the design of a more capable fighter for the future, the Eurofighter of the 1990's.[70]

If the Tornado was the test bed, the Eurofighter was seen as the model endeavor for European defense integration, for better or worse. In the summer of 1985, Britain, Germany, Italy, Spain, and France began talks about the next generation European fighter plane, then known as the European Fighter Aircraft, or EFA, especially needed by the West Germans to replace the F-4 Phantom and to deal with the relentless progress of Soviet fighter aviation in the final phase of the Cold War. The principle justifications for the project were to pursue the air-to-air capability lacking in the still-young Tornado, and to create jobs on the continent. Additionally, Europe's defense aerospace industries recognized that unless they produced a true fourth-generation fighter akin to the F-16 or F-15, their aerospace engineers were in danger of permanent exclusion from the fighter jet field. France predictably left the program to pursue an autonomous carrier-capable plane with the air-to-ground capacity it had missed by bowing out of the Tornado program. The remaining partners, the U.K. in particular, reportedly felt that "four-way collaboration is already seen as difficult enough" without having the notoriously difficult French in the mix.[71] Thus, the remaining partners willingly agreed on the requirement for a primarily air superiority jet, and after fixing on the appropriate industrial offsets decided to produce the aircraft together.

Numerous reasons were cited for pursuing collaboration in the EFA project. The U.K. Ministry of Defense, for example, stated the cost savings to be 20% over autonomous production, which they remained capable of undertaking. Other views purveyed that the EFA was a logical continuation of the Tornado program, and the partners had no reason to seek independent products given the relative success of the Tornado. But perhaps the true reason for collaboration is found in the rejection of the U.S.-made F/A-18 Hornet 2000 as an alternative choice. The U.K. and Germany rejected

[70] See Jane's All the World's Aircraft, http://jawa.Jane's.com.libproxy.nps.navy.mil/docs/jawa/search_results.jsp? (accessed November 2006).

[71] David White, "Take-off for the Eurofighter," *Financial Times* 17 May 1988, Editorial Section, 22. NOTE: Additionally, the French were direct rivals in airframes and engines to British Aerospace, adding to the benefits of their absence.

it for differing reasons, but the U.K. purportedly decided on the EFA before even learning of the Hornet option.[72] This illustrates the preconceived initiative to exclude the U.S. from any part in the project in order to guard the fragile autonomy of the European defense industrial bases. What became the Eurofighter subsequently saw numerous delays and cost overruns before becoming operational in the four air forces over ten years behind schedule. It remains to be seen if the program can be considered a success or failure for European defense industries, but if survival equates to success then the goal was achieved.[73] In fact as of summer 2006, all four participating countries boasted operational wings of the Eurofighter, with pilots lauding its initial capabilities while anticipating further upgrades.[74]

To conclude this section, one can suggest that the health of defense industrial bases on both sides of the Atlantic had a major impact on Europe's decisions to purchase fighter aircraft in the period leading to the end of the Cold War. Europe's recovering economies allowed it to challenge American hegemony, which drove the U.S. to seek more transatlantic collaboration in order to preserve its foothold on the continent. The end of this period witnessed continuing American influence in the smaller countries which remained incapable of large scale production within their combat aircraft industries. The larger industrial powers continued to collaborate and maintained some degree of autonomy in the face of their larger alliance partner across the ocean. This relative stabilization of the defense industrial base power struggle would set the stage for further evolution in the post-Cold War era.

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[72] Michael Donne, "Why three into one will go: EUROPE'S NEW COMBAT AIRCRAFT," *Financial Times* 3 August 1985, Section I, 6.

73 NOTE: The French project became the Rafale fighter, which is strikingly similar to the Eurofighter except for its ability to land on carrier decks. Today both aircraft are partially owned by the same parent company of EADS and are direct competitors in the export market, illustrating perhaps a failure for European defense integration. See European Aeronautics and Defense Space Company Website, Annual Report 2004, http://www.reports.eads.net/2004/ar_2004/en/index.php?top_nav_b3.phpand_n_b3_1_1_6.phpand_c_b3_1_1_6.phpand_s_b3_1_1_6.php (accessed October 2006).

[74] "24 July 2006 – Second German Air Force Wing Takes Eurofighter Typhoon – Seventh Eurofighter Unit in Operation," Eurofighter Press Release, http://www.eurofighter.com/News/Article/default.asp?NewsItemId=245 (accessed October 2006). See also Donna Richardson, "Eurofighter plans Typhoon Block 5 Upgrade," Jane's Defense Weekly, http://www4.Jane's.com/subscribe/jdin/doc_view.jsp?K2DocKey=/content1/Jane'sdata/mags/jdin/history/jdin2007/jdin71795.htm@currentandProd_Name=JDIN (accessed November 2006).

C. MILITARY INFLUENCE

Two trends defined fighter design during the Cold War period when viewed from a capability perspective. First, U.S. desires delineated which aircraft NATO flew, either directly or indirectly. Second, the ever-present Soviet threat kept the pressure on all air forces to keep up with the latest in fighter capabilities. NATO's push for rationalization, standardization, and especially interoperability (mostly espoused through U.S. calls for increased spending and capabilities in European militaries) ensured that each member state at least felt pressure to possess the latest in fighter capabilities. Until collaborative projects such as the Tornado arrived toward the end of the Cold War, European air forces consisted primarily of U.S.-made fighters, ensuring a fairly even distribution of capabilities.[75] Even as Europe designed and built its own aircraft, though, U.S. technology and the professed requirements for its alliance partners (expressed through NATO) continued to shape the capabilities of fighters in European nations. Therefore, a study of fighter capabilities and their influence on European decisions to procure them in this time frame is tied directly to developments in America.

From the defense spending boom of the 1950's to the waning days of the Cold War, the perfection of weapons technology in fighter designs followed a linear path. Such aircraft capacities as increased range, speed, altitude, and loiter time owed themselves to advances in materials technology for jet engines, while all-weather and night capability coupled with more sophisticated electronic warfare suites resulted from a steady advancement in aerospace technology The materials in airframes steadily became lighter and made aircraft more maneuverable in the air-to-air realm, and, in the 1950s, computers first appeared which increased navigation accuracy and pilot-to-aircraft interfaces. Weapons capabilities also advanced steadily during this time, with precision guided air-to-ground munitions and radar-guided air-to-air missiles (allowing for the first time a Beyond Visual Range, or BVR, capability in air combat) both reaching limited operational status and serving to define what "advanced" meant in fighter aviation.

Even in the prosperous U.S., however, such advances in technology did not automatically find themselves into fighter wings because of the perennial guns or butter

[75] Myron Hura et al., *Interoperability: A Continuing Challenge in Coalition Air Operations* (Santa Monica: Rand Corporation, 2000), 123.

issues of democracy. Though the generous defense spending of the 1950's generated large amounts of R and D funding and numerous different fighter projects, costs began to skyrocket in the course of the decade and air staff could no longer simply build a jet just because it was possible. In other words, technological feasibility had to bow before civil military realities. When the Kennedy administration took office in 1961 with its strategy of Flexible Response and its conventional warfare focus, the new Secretary of Defense Robert McNamara curtailed development costs through collaborative programs among the services. McNamara's dream joint fighter, the TFX, which later became the F-111 fighter-bomber, highlighted the problems of inter service rivalry and the dilemmas of aircraft procurement - it was not possible to satisfy all requirements for air combat and ground attack with one plane.[76] By contrast, the joint Air Force/Navy fighter, the F-4 Phantom II, proved a major success, putting the lie to criticism of McNamara once the aircraft saw extensive operations in both services.

The F-4 was indicative of the U.S. turn away from jets that could go faster and higher toward cheaper, multi-role workhorses that satisfied numerous design requirements. However, the Vietnam War highlighted serious limitations in strategy, as there was little allowance for the kind of aerial combat as actually unfolded in the skies over North Vietnam in 1966 or those over Egypt and Syria in 1967. In the case of the in the F-4's air-to-air capability versus the more nimble Soviet made MiG-17 and especially the MiG-21 (to say nothing of the fate of the Republic F-105) a sea change took place in U.S. fighter doctrine with implications into the 21st century. This change was accelerated by the failure of the F-111 in an operational role as a dogfighter. The sum of experience of 1964-1967 led directly to the development of the F-16 and F-15 as air superiority fighters. This coincided with the European Tornado project and, as such, heralded a divergence in transatlantic fighter capabilities that mirrored trans-Atlantic realities in the decade of the 1970s.

Many European air forces were flying the F-104 when the U.S. Air Force adopted the F-4 as its mainline fighter in the early-1960s. The F104G had been conceived within the strategy of massive retaliation to give the continental Europeans a say in NATO

[76] Mark A. Lorell, and Hugh P. Leveau, *The Cutting Edge: A Half Century of Fighter R and* D (Santa Monica: Rand Corporation, 1998), 103.

nuclear strategy as well as to adapt to the operational requirements of NATO's central front. However, the adoption of the F-4 led to its adaptation by other NATO countries, not the least of which was the Federal Republic of Germany. However, when the time came to replace the F-104's, the tendency to follow U.S. trends met with increasing political desire for European industrial autonomy. This political process divided those who would choose the largely air-to-ground option in the European Tornado and those who opted in the 1970s for greater maneuverability and air-to-air capability with the American F-16. As previously addressed, the larger European industrial powers opted for the Tornado, in part to add vitality to their aerospace industries, but this policy severely limited their air-to-air capabilities in tactical and operational realms. Meanwhile, the countries that opted for the F-16 later saw huge leaps in its capability as an air-to-ground fighter. As such the evolution of the aircraft as a true multi-role aircraft put the nations still operating U.S. equipment at a distinct advantage as the cold war ended. Certain European nations attempted to make up for its shortfalls with a counter-air emphasis in the Eurofighter design of the mid-1980s, but the tactical gap between U.S. aircraft and their European counterparts had become considerable in the interval.

If the trend in overall airframe capacities showed an advantage toward those operating U.S. equipment at the end of the Cold War, aircraft upgrades and programs envisioned for the future still demonstrated Europe's desire to keep up with fighter forces in the air. At the end of the Cold War, roughly one third of European fighter squadrons were capable of operating at night and in adverse weather, while around half could engage an enemy in the air using BVR weapons.[77] Nearly all planned to continue progress in these areas to match the U.S. in the near future. F-16 users planned major upgrades to the Mid Life Update (MLU) aircraft and AMRAAM missiles, while Germany sought to improve its F-4 fleet with radar missiles as well. The French had modified the Mirage-2000 into fairly capable air-to-air and air-to-ground versions. The

[77] Hura et al., *Interoperability: A Continuing Challenge in Coalition Air Operations*, 123-125.

Tornado, which equipped roughly a third of European squadrons at the end of the Cold War, was close to the end of its operational life, but the Eurofighter promised further tactical advantages in the air for participating nations.[78]

Thus, when seeking the degree to which tactical and operational capabilities mattered to European decision-makers in the purchase of fighter aircraft during the Cold War, one finds the answer distinctly mixed with that of defense industrial base, political and economic issues. The progress from one collaborative fighter to the next and mid-life upgrade programs to these jets indicate that tactical and operational requirements of air/land battle mattered to makers of policy. At the same time, however, the Tornado demonstrated the willingness to compromise capability for multi-national cooperation in the Alliance and civil military spheres. An excellent insight on political, economic, and military factors all interacting to shape decisions in this period is found in 1975 as four governments sought replacements for their F-104Gs. What became the "deal of the century" would exemplify where transatlantic trends in fighter procurement were headed.

D. THE F-16 ACROSS THE ATLANTIC

When Belgium, Denmark, Norway and the Netherlands signed the Memorandum of Understanding (MOU) to purchase the F-16 Fighting Falcon from American contractor General Dynamics on July 21, 1975, NATO saw the birth of perhaps the vanguard program on collaborative purchases of fighter aircraft. While entire books have been written on the sales program alone,[79] the student of this phenomenon can induce lessons from many different aspects of the European Partner Group (EPG) program, as it came to be called. When analyzed from the perspective of development, sales, production, maintenance, upgrades, and interoperability, the F-16 program serves as a model for future programs. In addition, the issues that swayed governments to choose the aircraft over its European competitors demonstrate the interaction of politics, industry, and the military in major defense purchases.

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[78] John T. Correll, "Fifty Years of European Fighter Trends," *Air Force Magazine* 74, No. 2, February 1991, http://www.afa.org/magazine/1991/0291euro.asp (accessed October 2006).

[79] See Ingemar Dorfer, *Arms Deal: The Selling of the F-16* (New York: Praeger Publishers, 1983) and Francois Verlinden, *Lock on No 2: General Dynamics F-16 Fighting Falcon* (O'Fallon, MO: Verlinden Publishing, 1983).

The development and sale of the F-16 represented the first time a fighter was designed for primary operation in both the U.S. and allied air forces. This contrasted with the previously discussed F-104 program, for example, which was originally designed for the U.S. Air Force but saw limited use in America.[80] When the USAF chose the General Dynamics F-16 in early 1975, the U.S. government strongly lobbied the four European countries in the market for a new fighter at the time (the EPG countries) to select the same aircraft.[81] Secretary of State Henry Kissinger glimpsed the potential political and economic advantages of such a sale, and as soon as the four countries expressed interest an unprecedented document arrived in all four capitals promising deals of collaborative development, technology sharing, logistical support and industrial offsets in the event of a sale.[82] Such a use of aircraft for alliance cohesion fit well within the renewed U.S. emphasis on Europe in the face of the defeat in Indochina. U.S. Secretary of Defense Jim Schlesinger joined the strong U.S. push to sell the F-16. He espoused the benefits in interoperability and standardization of the four countries that flew the same aircraft. Defense ministers of the four countries were treated to aircraft demonstrations and numerous briefings about capability and cost, while discussing the offset percentage of manufacturing that could be accomplished at European factories. In the event of a sale, European companies would build 10% of General Dynamics' F-16's for delivery to the USAF, 40% of the EPG products, and 15% of the exports to other countries, and a list already indicated 66 European firms considered as possible subcontractors.[83] Clearly the Americans had strong interests in a European procurement of the plane and were executing a sophisticated sales plan fraught with forethought.

Reasons abounded to choose the F-16, but it was by no means a predetermined decision. All four nations flew the F-104G together and had experience and familiarity in purchasing American fighters. But many other variables played into their decisions. Interoperability, cost, capability, competing aircraft choices, Alliance unity, domestic politics, technology sharing, work share agreements and pressure to buy European

[80] Dorfer, *Arms Deal: The Selling of the F*-16, xviii.

[81] NOTE: West Germany briefly considered the F-16 but quickly rejected any single-engine design due to the F-104's regrettable safety record , thus ended a German role in the plane before it began.

[82] Dorfer, *Arms Deal: The Selling of the F-16*, 16.

[83] DOD Team Pushed F-16 Sale, *Aviation Week and Space Technology*, 20 January 1975, 22.

products all played into the EPG's decisions. The two other candidates were the French-made Dassault-Breguet F1/M53 and the Swedish Saab-Scania Viggen 37E, both capable fighters in their own right, but clearly inferior when faced with the capability and cost advantages of the F-16. A NATO Steering Committee conducted a comparison study of the three aircraft and found the F-16 superior in almost all categories including combat radius, maneuverability, and weapons load capacity as well as the critical economic issues of fuel efficiency and projected maintenance costs. Some sources estimated an F-16 would pay for itself over its lifetime given the fuel savings when compared to the other candidates. The Swedish and French programs involved older aircraft, thus affording the F-16 a seven year advantage in technology which proved critical given the improvements in computing potential occurring in the 1970's. Clearly the U.S. option touted the more capable jet, but naturally other political and economic factors entered into play.[84]

Predictably, diplomatic issues both internal and transatlantic surfaced that would affect the purchase decisions. For example, one element which shaped the EPG countries' assessment of the F-16 was its lack of a radar-guided missile and all-weather capability (perhaps its only weakness), and U.S. political issues prevented a clean solution. The parallel F-15 program needed to justify its existence to Congress by touting advantages over the F-16, those being radar missiles and all-weather capability. Thus, the EPG countries were informed off-the-record that the F-16 could be upgraded in these areas, and the gap would be closed when the F-15 program was firmly established in the eyes of Congress.

In NATO Europe, familiar issues echoed in the halls of legislatures and defense ministries. It was doubtful if Denmark's defense budget would be large enough to commit to such a purchase; Norway would not obligate itself unless the other three countries joined; and internal political turmoil ruled in Belgium as pressure mounted from the French-speaking faction of government to buy the Dassault product. The Dutch considered the French jet for reasons of European unity, but abandoned the idea after tiring of French business practices and lack of progress in the program. A positive factor

[84] "NATO Reports on Fighter Comparisons," *Aviation Week and Space Technology*, 7 April 1975, 41.

for the Europeans involved the U.S. commitment to buy at least 650 of its own aircraft, which would drive down the cost of the program and increase European confidence at the prospect of U.S. Air Force jets stationed on the continent alongside EPG models. The French were unable to commit to such numbers for Mirages in their own air force and consequently fell out of favor with the European nations looking to purchase new fighters.[85]

Ultimately, EPG countries dismissed the two other aircraft and selected the F-16 after a year of intense deliberation. The decision to forgo European unity should not be discounted for its significance. A European fighter certainly remained a possibility for a slightly higher price, but the losses in aircraft capability, industrial offsets, and political clout with the strongest alliance partner were simply not worth the savings.[86] It was a decision from which they would reap benefits for decades after.

After the EPG countries (which later became known as the European Participating Air Forces, or EPAF) took delivery of the first F-16's in 1978, the advantages of producing and maintaining the aircraft in their own countries continued. Belgium and the Netherlands both produced the aircraft within their borders, and each country reaped industrial benefits through ongoing depot-level maintenance, spare parts manufacture, and logistics support. But most important, the prospects of operating and upgrading the same aircraft together throughout its lifecycle offered more advantages than originally foreseen by the countries involved. Unlike its predecessors, the easily upgradeable F-16 was designed efficiently from the outset to incorporate changing technologies, a capacity not lost on the export versions. As the U.S. Air Force upgraded from the original A/B models to the C/D version of the jet, the Europeans incorporated the OCU (Operational Capabilities Upgrade) program into their own versions to allow them to keep pace. Later, as the U.S. models touted increasingly sophisticated avionics, the EPAF readily upgraded their existing jets to the F-16 MLU (Mid-Life Upgrade) version, which essentially equalized the capabilities of U.S. and European models. This required revising U.S. technology transfer laws, a sensitive undertaking but one decidedly worth the security

[85] "The Cheapest and the Best," *The Economist*, 12 April 1975, 55.

[86] Dorfer, 205-208.

risks given the political and economic gains. The MLU program, in keeping with the spirit of the F-16 sale, is praised as a success in cooperative procurement working toward the goal of improved combat capability.[87]

Taken in perspective three decades later, perhaps the greatest ongoing benefit of the EPAF F-16 program has been the continued advantages gleaned from operating the same aircraft over the years and such benefits for alliance cohesion and the shared human and technological aspects of NATO. The ministries of defense, air staff, and airmen of Belgium, Denmark, Norway, and the Netherlands have shared knowledge and operating procedures since the program's inception, which has synergistically improved their collective combat potential over the years. The European Fighter Weapons Instructor Training (FWIT) program has operated under the umbrella of U.S. Air Force F-16 tactics and training, ensuring maximal participation and cooperation between the four countries and the U.S. with the common goal of increasing the lethality of the weapons system. While the Kosovo conflict raised many concerns about the lack of interoperability of NATO forces in combat, the EPAF F-16 operators were already standing by with their solution. What criticism was offered to European F-16 users involved a lack of capability compared to U.S. versions, but the post-Kosovo upgrade to the MLU version (previously planned but not yet implemented) effectively nullified many of the shortfalls. Ongoing operational exercises and mutual avionics upgrades (often in conjunction with a new U.S. capability) between the countries continue to maximize the advantages of interoperability found in the EPAF program.[88]

One can thus summarize that the F-16 sale of the late-1970s to Belgium, Denmark, the Netherlands and Norway exemplified an innovative, ambitious and successful process on many different fronts. Political factors played minor roles in the process while industrial and military advantages gained in the program seemed to weigh more heavily on national governments. Due to the timing of aircraft replacement programs, the resurgence of defense industrial bases on the continent, and a desire for European autonomy in other countries, only the four relatively small EPAF countries

[87] Frank Camm, *The F-16 Multinational Staged Improvement Program: A Case Study of Risk Assessment and Risk Management* (Santa Monica: Rand Corporation, 1993).

[88] Author's personal experience as an F-16 exchange pilot with the Belgian Air Force, 2001-2003.

entered into the collaborative program, and it demonstrated the shifting balance of power in transatlantic defense cooperation. America was no longer guaranteed military hardware sales to European clients, but industrial cooperation and a superior product ensured continuing U.S. influence on the continent. According to one senior General Dynamics executive, "If we had not offered them a satisfactory co-production deal, they would have bought either from the French or the Swedish, despite a higher price and lower technology."[89] The F-16 competition has been hailed as a "reasonably good example of the best way to develop expensive weapons for the Alliance: parallel development, competition, selection of the best and then shared production."[90]

The F-16 program demonstrated how the complex interaction of politics, industry, and military influence could merge in a program that became the paradigm of collaborative weapons ventures of its day. The F-16 continues to enjoy success and demonstrate the viability of an American product that promotes transatlantic cooperation on all fronts in the 21st century, even amid the shifts of the post-Cold War political environment. Greater transatlantic frictions and a growing concentration and nationalism in aerospace industries of the U.S. and Europe reflect a very different set of political and economic factors than operated in 1975. Nonetheless, the virtues of the F-16 program for alliance cohesion and aerospace cooperation across the Atlantic and beyond bear careful reflection.

[89] Harold D. Watkins, "The Politics of the F-16," *Forbes*, 15 December 1976, 61.

[90] "The Cheapest and the Best."

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III. EUROPEAN FIGHTER PROCUREMENT 1989-PRESENT

The end of the Cold War inevitably raised questions regarding the path of U.S./European relations and such affected the matter of men and machines in the air at the end of the 20th century. With the demand for a peace dividend as well as greater concentration in the aerospace sector and a closer alignment of the industrial policies of the U.S. and the European Union, the future of defense procurement remained quite uncertain on both sides of the Atlantic. NATO itself moved from collective defense in the narrow sense of Article V to embrace the ideals of Article III and IV of the Washington Treaty. Vanished was the horizon to the east filled with threatening clouds of Warsaw Pact aircraft, as an air threat seemed a distant possibility. Defense industries in both the U.S. and Europe continued to merge, and the absence of a common threat empowered market forces amid globalization and made nonsense out of the seemingly compelling procurement policies of the 1970s. The imperative of tactical and operational capabilities took a back seat to budget priorities as governments concerned themselves more with the inevitable reduction of defense budgets, especially in Europe. Some time passed before the full course of the conflict in the Balkans began to underscore the continuing need for modern weapons in the air. Following NATO's air war in Kosovo in 1999 and conflicts arising from the attacks of September 11, 2001, cutting edge aerospace power and coalition warfare returned to public debate. The modern fighter jet continued to play a strategic and tactical role as a symbol of the willingness of western democracies to defend themselves in the era of strategic turmoil that attended the 1990s and the new century.

Most fighter aircraft procurement decisions in Europe since 1989 can be tied to such pre-Cold War programs as the Eurofighter, dubbed the Typhoon as it entered service in the present decade. The EPAF F-16 countries relied on their existing aircraft and such ongoing upgrades as the MLU to remain capable in the combat environment. As of this writing in 2006, numerous NATO governments (including the original EPAF members) are faced with difficult decisions regarding replacement of their existing fighters. This chapter examines the state of European fighter procurement from 1989 to present through an analysis of political, economic, and military factors, while seeking to determine which

factors weighed (and continue to weigh) on decision-makers faced with replacing their combat aircraft in the post-Cold War environment. The chapter finishes with an examination of fighters currently available for purchase in today's "post-post-Cold War" world and how the aforementioned factors interact to shape decisions for those now in the replacement market.

A. POLITICAL INFLUENCE

As suggested above, the political landscape has changed drastically since the end of the Cold War and numerous diplomatic, strategic and economic dynamics have arisen to influence decision-makers in the procurement of materiel. Domestic and international political factors influence these decisions both within NATO and outside the Alliance. While one cannot always pinpoint the degree to which politics affect the respective procurement choices, general analysis of the factors that affect such materiel purchases can aid the analysis at hand.

1. Transatlantic Relations

At the risk of oversimplification, one can suggest that transatlantic relations generally remained positive throughout the 1990's. Worries as to whether NATO would survive after the Cold War were assuaged with its enlargement eastward and the consequent new-found purpose.[91] The "unipolar moment" raised concerns in continental Europe especially about American free market and neo-conservative hegemony and abuse of power as the lone remaining superpower. But despite certain differences in views regarding the use of force on the two sides of the Atlantic, the NATO allies individually and collectively accomplished much amid some setbacks in the 1990s: the

[91] See Ronald D. Asmus, *Opening NATO's Door: How the Alliance Remade itself for a New Era* (New York: Columbia University Press, 2002) and Celleste A. Wallander, "Institutional Assets and Adaptability: NATO after the Cold War," *International Organization* 54 (Autumn 2000): 705-735.

unification of Germany; the end of the Cold War; the waging of the 1st Gulf War; and finally, the successful diplomacy to limit the ill effects of the break up of Yugoslavia.[92] But the close of decade brought signs of growing divergence.

Disparities in operational military capabilities highlighted in the air over Kosovo in 1999 resulted in a marginalized decision-making process and little sharing of U.S. intelligence. This led some European nations to resent the perceived U.S. political and strategic dominance in the conflict and fostered American distrust in the reliability and effectiveness of its allies on the battlefield. In 2001, numerous policies of the Bush administration fueled European concerns of an American abandonment of multilateralism and the junking of the transatlantic bond. These political disagreements seemed to ossify following the 9/11 attacks and the U.S. decision to invade Afghanistan despite rejecting most aid offered by its NATO allies as Article V of the Washington Treaty was invoked for the first time.[93] Instead, European forces were employed under the new tenet of the "mission defines the coalition," which appeared to dispense with the kind of alliance statecraft that had been present with previous U.S. administrations. The United States National Security Strategy of September 2002 confirmed that America would strike preemptively and without U.N. mandates, without the help of its alliance partners if necessary, to defend itself from attack.[94] The phrase "the mission defines the coalition" and "coalitions of the willing" came to symbolize U.S. disregard of its allies' concerns and consultation across the Atlantic Ocean. This policy was naturally ill-received in certain continental European governments and the transatlantic relationship suffered especially in the period 2002-2004. The European Security Strategy of December 2003 echoed essentially the same security threats but emphasized tackling problems under U.N. mandates with maximum allied participation.[95]

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[92] Timothy Garten Ash, *Free World: America, Europe, and the surprising future of the West* (New York: Random House, 2004), 8-11. See also Michael Cox, "Beyond the West: Terrors in Tranatlantia," *European Journal of International Relations* 12 (June 2005): 203-233 for an overview of transatlantic relations in the 1990's.

[93] Elizabeth Sherwood-Randall, *Alliances and American National Security* (Carlisle, PA: Strategic Studies Institute, 2006), 9.

[94] *The National Security Strategy of the United States of America* (Washington D.C.: The White House, 2002).

[95] *A Secure Europe in a Better World: European Security Strategy* (Brussels: Council of the European Union, 2003), 5, 10.

The well-publicized fissure between the U.S. and certain European countries (notably France, Germany, Belgium and Luxembourg) following the U.S. invasion of Iraq in April of 2003 served to underscore the fragile nature of transatlantic relations. Important NATO members clearly were not prepared to offer unconditional support to their larger alliance partner (unlike the days following the 9/11 attacks) and America disregarded their importance. Other political issues further deteriorated relations, including U.S. refusal to sign the Anti-Ballistic Missile (ABM) and Kyoto Treaties, U.S. treatment of prisoners in the Global War on Terror (GWOT), the European Union arms embargo on China, and trade disputes involving Microsoft and Boeing to name a few.[96] In many ways, however, the "rift" over Iraq was exaggerated by certain figures and movements eager to pursue their respective domestic political goals and the healing process began quickly (on the surface at least) despite certain media and limited public opinion otherwise.[97] State visits to Europe in the beginning of the second Bush administration in 2005 emphasized the renewed importance of the transatlantic bond, and the collective diplomatic effort to diffuse the nuclear situation with Iran of that year illustrated the inevitable and welcome mending of fences.[98] Also, as the U.S. continues military operations in both Iraq and Afghanistan as of 2006, it has placed greater emphasis on the importance of its coalition partners to achieve vital security goals.[99] And despite ongoing disputes, the U.S. and the European Union remain the world's strongest trading partners (totaling $1.1 trillion or more annually)[100] with similar security interests.[101] Common sense seems to have reasserted itself after the spasm of 2002-2003.

To be sure the transatlantic tides have seen stormy ebbs and flows since the dawn of the 21st century, but views on both sides holds that the transatlantic bond at least has

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[96] Kristin Archick, *The United States and Europe: Possible Options for U.S. Policy* (Washington D.C.: Congressional Reporting Service, Report #RL32577, 23 January 2006), 2.

[97] See Thies, *Friendly Rivals*, 276-282.

[98] *SIPRI Yearbook 2006: Armament, Disarmaments, and International Security* (Stockholm: Stockholm International Peace Research Institute, 2006), 1.

[99] Michèle A. Flournoy, Julianne Smith, Guy Ben-Ari, Kathleen McInnis, David Scruggs, *European Defense Integration: Bridging the Gap between Strategy and Capabilities* (Washington D.C.: Center for Strategic and International Studies, 2005), 7.

[100] Archick, 2.

[101] *SIPRI Yearbook 2006*, 1.

the capacity to recover from recent difficulties.[102] However, one must not discount the continuing effects of the divisive Iraq conflict, both across the Atlantic and in Europe itself, as well as lingering differences on aforementioned issues. Clearly there is still work to be done to fix the damage. For instance, Pierre Lellouche, outgoing president of NATO's Parliamentary Assembly, with an eye to the NATO peace enforcement and security building operation in Afghanistan of late-2006 remarked:

> I must admit that I am concerned about the fate of the Atlantic Alliance… I have my concerns, first of all because our American friends and allies do not give me the impression of having truly chosen a direction for the future of the Alliance…Unilateralism on one side, verbal incantation on the other, the outcome could be tragic, as we are now seeing in Afghanistan where, if we are not careful, NATO, which is now covering all of the Afghan territory, risks being placed in a difficult situation militarily by the Taliban due to a lack of sufficient resources in the field.[103]

Thus, resentment and concern undoubtedly lingers in European minds, but to which extent remains unclear. The construction of Europe and especially a kind of Fortress Europe mentality as concerns industrial policy can perhaps inter-mingle with the more general geo-strategic stresses and strains of the new century. Such phenomena operate in the purchase of fighter aircraft on a multi-national basis.

2. The Rise of a European Defense Arm

The end of the Cold War witnessed a shift in the transatlantic military balance as the European Union gradually acquired more foreign policy and defense autonomy since 1991. This policy has primarily been due to: 1.) the need to redistribute the economic burden of providing for Europe's security and 2.) conflict in the Balkans required more European military force (as credibility to back up diplomacy) and the autonomy to use it outside of NATO in order to legitimize their diplomatic efforts in the region.[104] Also, an increasing European role in world affairs and growing assertiveness vis-à-vis the United

[102] For an alternate viewpoint on the issue, see Michael Cox, "Beyond the West: Terrors in Tranatlantia," *European Journal of International Relations* 12 (June 2005): 203-233.

[103] "NATO PA's Outgoing President Expresses Concern for NATO's Future," *NATO Press Communiqué*, 16 November 2006.

[104] *The NATO Handbook* (Brussels: NATO Public Diplomacy Division, 2006), 244-245.

States contributed to the Common Foreign and Security Policy (CFSP).[105] At St. Malo in 1998, Britain and France decreed that the EU must have the "capacity for autonomous action, backed up by credible military forces, the means to decide to use them, and a readiness to do so, in order to respond to international crises."[106] What thus became the European Security and Defense Policy (ESDP) was officially welcomed at NATO's Washington Summit in 1999, where the allies agreed that a stronger European defense would contribute to the "vitality of the Alliance in the 21st Century." The EU would concentrate on the Petersberg Tasks – humanitarian search and rescue missions, crisis management tasks including peace enforcement, and environmental protection – while benefiting from NATO assets and capabilities through the so-called Berlin Plus agreements of 2003.[107] U.S. Secretary of State Madeline Albright famously declared U.S. support for European defense integration on condition that the "3 D's" were avoided: no Diminution of NATO, no Discrimination of non-EU members of NATO, and no Duplication of NATO responsibilities.[108] NATO and the EU have cooperated on numerous defense issues, notably the advancement of European military capabilities through the EU's European Capabilities Action Plan (ECAP) of 2001 and the NATO-EU Capability Group of 2003. The EU formed the European Defense Agency (EDA) in July of 2004 to "focus on the development of defense capabilities, research, acquisition, and armaments."[109] However, it is an organization facing tremendous challenges to becoming efficient and effective.

The EDA exercises scant influence over EU member states in the area of defense procurement despite efforts otherwise. This is best illustrated by the attempt in November 2005 to establish a more open market for defense equipment, which typically was exempted from EU market rules under Article 296 of the EU Treaty. A Code of Conduct

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[105] Rafael Biermann, professor, Naval Postgraduate School, Monterey, CA.

[106] "Joint Declaration of British-French Summit, St. Malo, 3-4 December 1998," in *From St. Malo to Nice: European defence: core documents* (Paris: Institute for Strategic Studies, European Union, 2001), 8.

[107] *The NATO Handbook 2006*, 246-249.

[108] Statement by Madeline Albright at Press Conference for Foreign Ministers Meeting, NATO HQ, Brussels, 8 December 1998, http://www.nato.int/docu/speech/1998/s981208x.htm (accessed November 2006). (NOTE: The no "diminution" of NATO has also come to be known as no "decoupling" of the U.S. from NATO, though the text of the original speech does not reflect it as such).

[109] *The NATO Handbook 2006*, 251.

on Defense Procurement was signed by 22 of the 25 member states which essentially required open competition between the participating member states for all defense-related equipment. The goal of the document and the EDA is a common European Defense and Equipment Market (EDEM) where all members would have equal access to defense-related contracts. However, the code remains strictly voluntary and states that collaborative programs and issues of "pressing operational urgency" and "compelling reasons of national security would justify a nation purchasing equipment on its own accord."[110] The implications for large-scale procurement such as fighter aircraft are clear, given the economic factors present and "traditional reticence of member states to give up national prerogatives in defense matters."[111] The Code of Conduct and its inherent limitations illustrates the uphill struggle the EDA will face to coordinate defense procurement in the European Union.

While statements or rhetoric from NATO, the EU, and the U.S. would imply all sides benefiting with the rise of a European defense arm, this remains a simplified view. Certain camps maintain that Europe is attempting to counter U.S. dominance in global affairs by becoming a powerful political counterweight, even at the expense of NATO.[112] Some suggest Europe's weakened stance beside the U.S. in Kosovo led to the development of ESDP for autonomy beyond the so called Petersberg Tasks. Perhaps the next conflict will see Europe fighting as the EU, an equal partner to the U.S. but not constrained by the American-led NATO.[113] Others maintain that a defense arm of the European Union is merely the most efficient way to integrate militaries and industrial bases and in fact, it benefits the U.S. as much as Europe. Regardless, the rise of the ESDP and EU agencies such as the EDA acted as both an avenue and additional source of pressure to improve military capabilities on the continent and to purchase more European

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[110] *The Code of Best Practice in the Supply Chain, European Union Document* (European Defense Agency, 2006).

[111] Burkard Schmitt, *Defense Procurement in the European Union: The Current Debate* (Paris: Institute for Strategic Studies, European Union, 2005), 14.

[112] Seth G. Jones and F. Stephen Larrabee, "Arming Europe," *The National Interest* 82 (Winter 2005/2006): 62-68.

[113] See John E. Peters et al., *European Contributions to Operation Allied Force: Implications for Transatlantic Cooperation* (Santa Monica: Rand Corporation, 2003), 68, and Richard North, "The Wrong Side of the Hill," *DefenseIndustryDaily*, August 2005, 7, http://www.defenseindustrydaily.com/files/UK-EU-US_Wrong_side_of_the_hill_def_4.pdf (accessed July 2006).

equipment. However, the limitations of the EDA's influence promises to keep American hardware an option to decision-makers for some years to come granted the heterogeneous nature of Europe even today and the multilayered links visible even in the procurement of aerospace materiel.

3. NATO and its Influence

Most political issues in the days since the Cold War have played out in NATO's conference rooms. Burden sharing, perhaps the most popular, yet generally misunderstood alliance-related subject, scarcely disappeared with the end of the Berlin Wall, as many European leaders likely wished; rather, this phenomenon assumed greater importance in the 1990's.[114] With the U.S. harboring a sense of less responsibility for European security, there was further impetus for Europe to increase its defense expenditures. The focus became not only Euro spent, but the actual capabilities needed to meet emerging security threats such as those in Balkans.[115] Criticism was leveled at Europe concerning the *efficiency* of its defense budgets, as figures showed the same countries NATO rebuked for deficient capabilities spending significantly more on personnel and infrastructure, at the expense of military equipment and training. In 2006, NATO continues to push its European member states to spend more on modernization in addition to research and development (R and D) to improve their capabilities. The U.S. continues to shoulder a great deal of the R and D burden, spending up to six times more than all of Europe combined.[116] The "capabilities gap" that opened between the U.S. and Europe in the decade following the end of the Cold War (discussed in detail later in subsequent sections) still exists and NATO consequently continues to push its members to upgrade their forces. The Comprehensive Political Guidance from the Riga Summit of 2006 stresses the need for equipment which is "deployable, sustainable, interoperable, and useable." It also adds the importance of the "effective" use of funds for investment,

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[114] See Thies, *Friendly Rivals: Bargaining and Burden-Shifting in NATO* for perhaps the most definitive work on this subject.

[115] Gustav Lindstrom, *EU-US burdensharing: who does what?* (Paris: Institute for Security Studies, Chaillot Paper 82, September 2005), 15.

[116] Gordon Adams, Guy Ben-Ari, John Logsdon, and Ray Williamson, *Bridging the Gap: European C4ISR Capabilities and Transatlantic Interoperability* (Washington D.C.: National Defense University, 2004), 122.

and the "greatest practicable interoperability and standardization among allies."[117] This pressure certainly weighs on decision-makers when asking what capabilities are necessary in their future fighters.

Table 1. Defense Expenditures as % of GDP

Based on constant prices

	Average 1985-1989	Average 1990-1994	Average 1995-1999	Average 2000-2004	2001	2002	2003	2004	2005e
Belgium	2.7	2.0	1.5	1.3	1.3	1.3	1.3	1.3	1.3
Bulgaria	//	//	//	//	//	//	//	2.4	2.5
Canada	2.1	1.8	1.3	1.2	1.2	1.2	1.2	1.2	1.1
Czech Republic	//	//	//	2.0	2.0	2.0	2.1	1.9	1.8
Denmark	2.1	2.0	1.7	1.5	1.6	1.5	1.5	1.4	1.4
Estonia	//	//	//	//	//	//	//	1.6	1.7
France	3.7	3.3	2.9	2.5	2.5	2.5	2.6	2.6	2.5
Germany	3.0	2.1	1.6	1.5	1.5	1.5	1.5	1.4	1.4
Greece	5.1	4.4	4.6	3.6	4.6	3.4	2.8	2.9	3.1
Hungary	//	//	//	1.7	1.8	1.7	1.7	1.5	1.3
Italy	2.8	2.5	2.1	2.0	2.0	2.0	1.9	1.8	1.7
Latvia	//	//	//	//	//	//	//	1.3	1.4
Lithuania	//	//	//	//	//	//	//	1.5	1.3
Luxembourg	0.9	0.8	0.7	0.7	0.8	0.7	0.7	0.7	0.8
Netherlands	2.8	2.3	1.8	1.6	1.6	1.6	1.6	1.6	1.7
Norway	2.6	2.5	1.9	1.9	1.7	2.0	1.9	1.9	1.7
Poland	//	//	//	1.9	1.9	1.9	1.9	1.9	1.9
Portugal	2.6	2.6	2.2	1.8	2.1	1.6	1.6	1.7	1.7
Romania	//	//	//	//	//	//	//	2.1	2.0
Slovakia	//	//	//	//	//	//	//	1.8	1.8
Slovenia	//	//	//	//	//	//	//	1.5	1.7
Spain	2.1	1.6	1.4	1.3	1.2	1.4	1.3	1.3	1.2
Turkey	4.6	5.2	5.0	4.1	4.9	4.2	3.8	3.1	3.2
UK	4.8	3.9	2.7	2.4	2.5	2.4	2.4	2.3	2.3
United States	6.3	4.8	3.4	3.4	3.1	3.3	3.7	3.8	3.7

Source: NATO website. http://www.nato.int/docu/pr/2005/p05-161.pdf

e - estimated
.. - not available
- nil
// not applicable

NATO's decision to enlist new members (undertaken in 1997 and realized in 1999) was driven more so by geo-political factors connected with the fate of Europe in the 20th century as opposed to a red versus blue threat as in 1961 or 1983. The nations of Central and Eastern Europe required the extension further east of security and freedom to efface the legacy of the Warsaw Pact system.[118] In addition to such preconditions as a

[117] *Comprehensive Political Guidance: Endorsed by NATO Heads of State and Government on 29 November 2006*, NATO Online Library, http://www.nato.int/docu/basictxt/b061129e.htm (accessed December 2006).

[118] Speech by NATO Deputy Secretary General Alessandro Minuto Rizzo at the Law Faculty, University of Zagreb, 23 February 2006, http://www.nato.int/docu/speech/2006/s060223a.htm (accessed March 2006). See also Ronald D. Asmus, *Opening NATO's Door: How the Alliance Remade itself for a New Era* (New York: Columbia University Press, 2002).

"functioning democratic political system" and "democratic civil-military relations," prospective members were obliged to have the "ability to make a military contribution to the Alliance."[119] For those that acceded to the Alliance, relatively weak economies and meager defense budgets opened the door to numerous issues of political loyalty played out in their defense procurements. Of the three nations who joined in 1999, only Poland was able to undertake a major purchase of fighter aircraft, but it demonstrated the sort of political pressure placed on leaders through such a highly visible and significant endeavor.

France, Sweden, and the U.S. all lobbied heavily through their respective fighter aircraft industries to win the contract in Poland to replace its aging fleet of Soviet fighters with sophisticated Western models. What became a heated competition in 2001-2003 to land a lucrative deal was fraught with more political undertones than Poland hoped, as the rift between "Old Europe" and the U.S. played out in their wooing of a new ally. In January of 2003 Poland signed the "letter of eight," promising support for an invasion of Iraq. When later that year it signed to purchase 48 F-16 Block 52's from the U.S. company Lockheed Martin, France and Germany were particularly critical of Poland's apparent lean toward the U.S. as the most vocal abstainers from the Iraq War. Poland also stood accused by France of disloyalty to European "industrial and foreign policy decisions," which potentially threatened its entry into the European Union (it joined in 2004 regardless). Later, as Poland pulled its troops from Iraq in 2005, questions arose in Poland's legislature as to whether the U.S. consequently slowed offset deals in conjunction with the F-16 sale.[120] Some have suggested the aircraft deal from the beginning was directly tied to Poland's commitment of troops to Iraq, and while this is unlikely it remains difficult to disprove.[121] Poland, regardless, has resented being put in

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[119] *Project Air Force 2001 Report* (Santa Monica: Rand Corporation, 2001), 20.

[120] Judy Dempsey, "Polish air carrier faces delicate choice; Buy American or buy European? Either decision could bring unpleasant repercussions," *International Herald Tribune*, 29 October 2004, 3, http://www.iht.com/articles/2004/10/29/poland_ed3__3.php (accessed November 2006).

[121] Robert Little, "U.S. Dollars Wooed Ally in Iraq Coalition," *The Baltimore Sun*, 14 October 2004, http://www.informationclearinghouse.info/article7097.htm (accessed November 2006).

the difficult position of choosing between feuding allies and maintains that the $3.5 billion F-16 deal with its accompanying $6 billion in potential offset agreements was solely an economic and strategic decision, not for political alignment.[122]

Poland serves as the most visible example of the political slants found in newer NATO members' procurement decisions. Many smaller nations with significantly less capable air forces are feeling NATO's pressure to upgrade their capabilities despite meager defense budgets. Bulgaria is considering both F/A-18 E/F's and F-16's from the U.S. as well as the Swedish Gripen for a fighter purchase in the next two years.[123] Hungary and the Czech Republic recently decided to lease Gripen fighters with an option to buy, no doubt to the consternation of U.S officials. Pressure to be interoperable with NATO's most influential member is part of the U.S. industry's lobbying campaign for these potential customers and future coalition partners.[124] Newer NATO nations also seem to lean toward the U.S. in other procurement decisions as well, such as their choice of the U.S.-made C-17 cargo plane over the Airbus A400M. Of the thirteen nations who recently signed to purchase the C-17 together through a NATO agreement, nine joined in 2004 and one (Poland) joined in 1999.[125] Economics played a large role in their decisions as well, as scant money in defense budgets drove them to the more affordable C-17 program.[126]

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[122] Dempsey, "Polish air carrier faces delicate choice; Buy American or buy European?" NOTE: Poland found itself in a similar situation when deciding between Airbus and Boeing to replace its aging 767 aircraft for its national carrier, Lot Airlines, eventually choosing the Boeing 787 aircraft.

[123] "Bulgaria offered F/A-18 E/F options," *Flight International*, 4 April 2006, http://www.flightglobal.com/Articles/2006/04/04/Navigation/239/205828/Bulgaria+offered+FA-18EF+options.html (accessed November 2006).

[124] Charles M. Sennott, "Arms Deal Criticized as Corporate Welfare," *The Boston Globe*, 14 January 2003, http://www.commondreams.org/headlines03/0114-02.htm (accessed November 2006).

[125] "NATO moves to acquire C-17 strategic aircraft," *NATO website*, 12 September 2006, http://www.nato.int/shape/news/2006/09/060912a.htm (accessed November 2006). (The nations involved in the purchase are Bulgaria, the Czech Republic, Denmark, Estonia, Italy, Latvia, Lithuania, the Netherlands, Poland, Romania, Slovakia, Slovenia and the U.S.)

[126] Lt. Col. Harry VanPee, Belgian Air Force representative to NATO for the European Air Transport Command, interview by email, 3 December 2006.

4. Domestic Politics

Political issues on the home front of NATO democracies have affected procurement decisions as much or more than external pressures. Logically, external issues played out domestically as well, with such subjects as the Iraq War and European integration dividing opinions on the domestic scene, often determining political futures in themselves. Additionally, the peace dividend and falling defense budgets gave rise to other factions in European politics. The diminished threat of great power conflict meant budgets could be funneled more toward social programs, and labor and demographic problems took on even more importance than before. Spending on defense, especially for programs aimed at the higher end of the conflict spectrum, was scrutinized in European legislatures as never before, and political capital spent on defense-related issues became a rarity, especially before conflicts in the Balkans materialized. The necessity to even replace existing fighter aircraft entered the debate, with mixed reactions. Funneling scant public funds into social programs which would guarantee more political support from a war-wary public seemed a viable option to many. This policy would involve posturing for a future air force that concentrates more on humanitarian missions and less on the expensive technology required to maintain viable fighter programs.[127] For example, the Social Democratic Party in Denmark recently proposed replacing their highly capable F-16 fleet with combat helicopters.[128] While most domestic political issues will be discussed in detail in the next chapter, it is safe to say they continue to play a large role in procurement decisions.

In sum, political influence both domestic and external has certainly wielded influence in the decision to purchase fighters since the end of the Cold War, but it is difficult to tell to which degree. NATO has pressured its members to keep up capabilities, and the European Union has pressured its members to remain militarily capable yet independent in the presence of U.S. demands. The U.S. has pushed its European allies to

[127] Stephen J. Coonen, "The Widening Military Capabilities Gap between the United States and Europe: Does it Matter?" *U.S. Army War College Quarterly* 36 (Autumn 2006): 69. NOTE: The counterargument holds that European publics would not accept casualties and would rather send pilots as a show of force who remain well-protected inside their expensive but stealthy fighters. Attributed to David Scruggs and Guy Ben-Ari, Defense analysts, Center for Strategic and International Studies, Washington D.C., Personal interviews conducted concurrently by author, 4 October 2006.

[128] "Fighter jets face copter swap," *The Copenhagen Post Online*, 16 November 2006, http://www.cphpost.dk/get/99081.html (accessed November 2006). Author's note: This will not happen.

buy American equipment or at least to equip themselves to remain capable and interoperable coalition partners or risk exclusion from future conflicts. Internally, European defense budgets have been scrutinized as never before, but in the end most countries that are in need of fighter replacements are currently in the market, including the smaller militaries to the East. The question on decision-makers' minds is not "whether" to buy fighters, but "What?" and "From whom?" with the latter question the most likely influenced by political factors. As is evident in the following section, political pressures may have led governments to increase capabilities and seek improved fighter aircraft, but this process has been largely implemented through dynamics between respective defense industrial bases.

B. DEFENSE INDUSTRIAL BASES

> In Europe there are also multiple national defence industries, supported as often for reasons of national independence and prestige as for reasons of effectiveness. Taken together, the result has unavoidably been duplication of effort and industry, lack of coordination in policies, and higher costs — all of which make it impossible for Europe to match US advances in technology development and defence procurement.[129]
>
> NATO review, Autumn 2002.

The end of the Cold War prompted similar phenomena in the defense industrial bases (DIBs) on both sides of the Atlantic, but on a much faster scale in the United States. Smaller defense budgets on both sides of the Atlantic necessitated industrial consolidation, but Europe was hampered by national priorities and fragmentation (and thus lagged the U.S. in this arena for many years). Currently, most theories hold that further transatlantic cooperation by defense firms will benefit both sides, with militaries becoming more capable and DIBs being strengthened as a consequence. However, there remain barriers to this approach on both sides. The U.S. is reluctant to share its technology and give up any industrial edge, and it possesses some very key advantages. European nations still would prefer to consolidate and create a DIB rival to the U.S. in

[129] James Appathurai, "Closing the Capabilities Gap," *NATO Review*, Autumn 2002.

the image of Airbus standing up to Boeing. A large question thus remains as to whether further cooperation will occur *across* the Atlantic, or if it will remain a bipolar state of affairs.

Following the collapse of the Soviet Union, the United States witnessed an excess number of defense firms and declining demand on the customer side (i.e. the Pentagon). Defense companies were faced with seeking new markets, diversifying into the civilian sector, consolidating with other firms, or going out of business. The only means of survival for most firms was to merge, and market forces thus fueled the rapid concentration of the U.S. defense industry. The Pentagon recently determined that the top 50 defense suppliers of the 1980's became the top five in 2003.[130] The American scene evolved in the 1990's into several behemoth defense companies which saw less competition and could spread R and D costs over a higher number of contracts. By the end of the decade, the U.S. defense industrial base could run circles around its European counterparts from an efficiency standpoint, and this prompted action across the Atlantic.[131]

Europe's defense industrial bases reflected their fragmented nature and governmental desires to guard both national autonomy and defense-related jobs for much of the 1990's.[132] Criticism has been leveled at France for slowing European progress during this period through its policies of industrial protection,[133] but all European governments employed protectionism to some degree in this sector.[134] In 1998, fears of a streamlined American defense industry dominating the world market alarmed Europe and with industry leading the way, they followed the American example and began aggressive cross-border consolidation of the DIBs. This action was initially absent of any governmental urging or guidance, but after the launch of ESDP in 1999, European governments began to look to the EU for help in improving their capabilities and consolidating demand. This eventually led to the creation of the European Defense

[130] Terrence R. Guay, *The Transatlantic Industrial Base: Restructuring Scenarios and their Implications* (Carlile, PA: Strategic Studies Institute, 2005), 7.

[131] Ann Markusen, "The Rise of World Weapons," *Foreign Policy* 114, (Spring 1999): 42.

[132] Guay, 4.

[133] Markusen, 44.

[134] Guay, 4.

Agency and European Defense Equipment Market (EDEM).[135] European firms clearly feared loss of influence in the face of Americans, as evidenced by a joint statement in June, 2004 from the CEO's of Europe's three largest defense firms stating that European governments and industry do not "wish to see indigenous defense technology overtaken or dependence on foreign technologies become a necessity." But the increased involvement of political agencies has prompted questions of additional European motives for consolidation, notably the EU's desire to act autonomously from the U.S. in military actions. Thus, consolidation would serve not only to compete with U.S. industry, but to decrease European dependence on U.S. products in their militaries.[136]

European defense industrial consolidation began in January 1999 in the United Kingdom when General Electric Company (GEC) merged with British Aerospace to become BAE Systems, currently the top defense company on the continent. More significantly, the privatization of France's Aérospatiale and Matra systems morphed into a multi-national consortium that combined aerospace companies in all major European industrial nations to become the European Aeronautic Defense and Space Company (EADS). Today EADS and BAE systems or their subsidiaries are responsible for most defense-related equipment produced in Europe, with EADS also heavily involved in the airline industry (through Airbus) and space ventures such as the Galileo project.[137] After the formation of these two titans, however, it was soon clear that "Fortress Europe," no matter how much it consolidated, still faced significant obstacles in the face of competition across the Atlantic.

An extensive study by the Center for Strategic and International Studies recently found that national interests and industry protection continue to dominate the European defense market, despite attempts at reform.[138] Policies of *juste retour*, or "programs divided up not by engineering or economic logic but by political expediency" still rule the defense industry and cause significant barriers to restructuring. The report

[135] Burkard Schmitt, *Defense Procurement in the European Union: The Current Debate* (Paris: Institute for Strategic Studies, European Union, 2005), 5.

[136] Jones and Larrabee, "Arming Europe," 63.

[137] Guay, 4-6.

[138] Flournoy et al., *European Defense Integration*, 74.

recommends ceding autonomy to the European Defense Agency in matters of defense acquisition in order to further rationalize demand and prevent the inefficiencies associated with shielding national industries from competition.[139] As previously discussed, there are inherent limits in the EDA's current approach to rationalizing demand as well, leaving national governments free to protect defense products as they see fit.

In July of 1998, Europe's six largest industrial powers (Germany, France, UK, Italy, Spain, and Sweden) signed a letter of intent (LoI) which later became the Framework Agreement (and still later the EDA), promising greater cross-border cooperation in defense acquisition. But even with this "rationalization" of Europe's defense industries, the six LoI countries represent 90 percent of Europe's defense industrial capabilities and 98 percent of its R and D spending, yet still spend roughly one sixth of the U.S. total on R and D.[140] It is important to note that these six countries represent Europe's autonomous capability to design and produce fighter aircraft. This is telling in two respects. Firstly, without further cooperation in the EU, Europe's non-LoI countries (the smaller industrial nations) are somewhat excluded from the process of producing fighter aircraft, forcing them to look to America for options. Secondly, the R and D figures demonstrate that even the six LoI nations will likely fall behind the U.S. in technological capacity unless cooperation is sought across the ocean as well. The UK was the first to realize this and act upon it.

In 1994, British Aerospace teamed with Northrop Gruman to bid on the nascent Joint Strike Fighter (JSF) project and following the rejection of their design teamed with Lockheed Martin to collaborate on the winning bid.[141] Today, BAE Systems (formally British Aerospace) is the number two contractor beside Lockheed Martin in the JSF venture, the largest foreign firm in the project with over $1 billion invested. In addition, BAE Systems recently purchased United Defense Industries for $4.1 billion, the largest ever purchase of an American defense firm by a foreign company. It recently sold its

[139] Flournoy et al., *European Defense Integration*, 74.

[140] Schmitt, 12. (NOTE: CSIS analysis determined these six countries comprised 55% of actual European defense output in 2004 and 97% of its RandD spending.)

[141] Markusen, 45.

share in Airbus (owned by EADS) at a significant loss in order to free up money for further U.S. acquisitions.[142] However, as illustrated below, the fact it is a British company has offered significant advantages to BAE and demonstrates once again the degree to which governments attempt to keep control of their defense industries.

Much as the European Union through the EDA attempts to keep business from leaving the continent, the U.S. government attempts to optimize any defense collaboration for the benefit of American industry as well, primarily (though not solely) through flexible legislation associated with the Buy America Act of 1933 and controls on exportation of technology. Recent legislation in Congress has attempted to block companies which receive government subsidies from competing in U.S. markets, a strategy clearly aimed to keep EADS and their Airbus aircraft from competing against Boeing for the enormous contract to replace U.S. Air Force tanker aircraft in the coming years. The Bush administration has threatened to veto such legislation, however, on the grounds that it limits flexibility in applying acquisition laws and may prompt retaliation against U.S. industry.[143] The U.S. government prefers to use the State Department selectively to apply export control laws for different technologies thereby controlling which allies are used in defense collaboration.[144] Transfer of technology continues to be the most contentious issue facing the U.S. in transatlantic defense cooperation and is widely considered to be the largest American-imposed roadblock to true transatlantic cooperation. As then Secretary General of NATO Lord Robertson remarked in a speech advocating further cooperation in June 2002:

> No one is advocating an 'anything goes' liberalisation of the U.S. Export Control Act. But there is legitimate concern that the rules are sometimes - perhaps unintentionally - applied to distort economic competitive advantages rather than protecting legitimate security concerns.[145]

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[142] Leslie Wayne, "British Arms Merchant with Passport to the Pentagon," *New York Times*, 16 August 2006.

[143] Jones and Larrabee, 65.

[144] David Scruggs and Guy Ben-Ari interview.

[145] Speech by NATO Secretary General Lord Robertson at GKN Farnborough Dinner, RAC Club, London, 25 July 2002, http://www.nato.int/docu/speech/2002/s020725a.htm (accessed October 2006).

The Defense Trade and Security Initiative (DTSI) of 2000 was intended to "streamline processing of arms export license applications and increase mutual security with our allies." Following the 9/11 attacks the State Department created the Directorate of Defense Trade Controls (DDTC) in January of 2003, which works in conjunction with NATO's Defense Capabilities Initiative to ensure the DTSI is implemented fairly and effectively.[146] Both initiatives attempt to check power from the executive branch which can over-politicize technology sharing and procurement decisions. But despite recent reforms, criticism continues against the U.S. export regime and its exclusion of European firms.[147]

Recent procurement decisions, however, illustrate a welcome and constructive trend toward further collaboration on both sides of the Atlantic, which benefits not only defense industries but taxpayers as well. AugustaWest, a subsidiary of the Italian aerospace giant Finmeccanica, recently won the contract to produce the next presidential helicopter. Also, the Eurocopter UH-145 is set to become the U.S. Army's next light utility helicopter, with orders placed for 42 aircraft so far (which presumably will not carry the "Eurocopter" moniker).[148] The future cargo aircraft for the U.S. military, the Joint Cargo Aircraft, will either be the C27J Spartan (made by Alenia NorthAmerica, a division of Finmeccanica) or the EADS Casa C-295, both non-American firms which will include American partners. Most telling is the battle shaping up to replace the U.S. Air Force tanker fleet, where Boeing has recently seen its monopoly on this type of aircraft evaporate. EADS, buoyed by a recent $23 billion sale of Airbus tankers to the United Kingdom, teamed with the U.S. firm Northrop to bid on the USAF deal.[149] A European aircraft comprising such a substantial part of the USAF fleet would be unprecedented to say the least and perhaps signal the arrival of an era where all military equipment will be

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[146] *DEFENSE TRADE: Arms Export Control System in the Post-9/11 Environment*, (Washington D.C.: General Accounting Office, GAO-05-234, February, 2005), 7-18.

[147] Jones and Larrabee, 67. NOTE: See Terrence R. Guay, *The Transatlantic Industrial Base: Restructuring Scenarios and their Implications* (Carlisle, PA: Strategic Studies Institute, 2005) for an excellent overview of U.S./European defense industrial relations in the post Cold War Era.

[148] "U.S. Places Second Production Order for Eurocopter UH-145 Light Utility Helicopters," Eurocopter Press Release, 6 November 2006, http://www.eurocopter.com/ (accessed November 2006).

[149] Ameet Sachdev, "Battle for U.S. Defense Work goes Global, Flies Above Issues," *The Chicago Tribune*, 23 July 2006.

"internationalized" and thus in an utopian sense avail the security and defense of all NATO nations with the least expensive and greatest public good for all concerned.[150]

In sum, transatlantic defense industrial bases have undergone significant changes following the Cold War, largely driven by industry itself and macro economic trends of globalization. The United States witnessed major integration beginning in the early 1990's and Europe was forced to follow beginning in 1998. Consolidation there took on political tones when the defense arm of the European Union gained steam, and issues of national sovereignty and Europeanism still govern policy in this realm. The United States government continues to wield influence primarily through its export control policy, but industrial collaboration persists between the two poles and seems to be the path of the future. Though a bipolar industrial base is currently giving way to multi-polarity in this arena, Europe still remains fragmented, with the larger industrial nations continuing to drive policy through the EU and the European Defense Agency. This consequently forces smaller countries to lean toward the U.S. in collaborative ventures. Thus, industrial issues and their manipulation by governmental bodies in Europe will have a large influence on defense procurement decisions there in the future.[151]

C. MILITARY INFLUENCES

The end of the Cold War did not halt the progression of capabilities in fighter aircraft. The disappearance of the Soviet threat resulted in an increase in regional conflicts and this consequently highlighted deficiencies in many air forces heretofore hidden. Operation Desert Storm of 1991 first demonstrated vast advancements in U.S. technology which left others behind. Several factors have been cited for this divergence

[150] NOTE: The issue of USAF tanker replacement is much more complicated, with WTO trade disputes between Boeing and EADS and prior convictions of impropriety between Boeing and the Pentagon playing major roles. Additionally, the incoming chairman of the House Armed Services Committee has vowed to block EADS from winning this contract for reasons of American pride and national security. Late-2006 developments seem to have quelled this issue but the bidding stands to be a major battle nonetheless.

[151] NOTE: This assessment of defense industries following the end of the Cold War does not examine larger economic issues present in Europe during this timeframe. Thanks to Rafael Biermann for pointing out that German reunification, EU enlargement, and a long recession contributed to declining defense budgets in Europe during this period, while a booming U.S. economy and differing threat assessments (especially after 9/11) contributed to larger defense budgets in America. This difference in relative spending contributed directly to the health of their respective defense industrial bases.

in capabilities which the 1990's brought to the surface. One theory holds that the "peace dividend" caused Europe to slow its investment in future technologies while others say perhaps the fragmentation of European militaries and their supporting defense industrial bases had finally been brought to the forefront. It is surmised that the U.S. system when compared to Europe had been designed for efficiency in deploying and implementing force - as well as autonomously producing its arms - and the expeditionary nature of conflict in the 1990's allowed the strengths of the U.S. structure to be realized.[152] For whatever reason, the issue of diverging defense capacity between the U.S. and Europe, subsequently named the "capabilities gap," congealed in the early 1990's and continues today. Once again, this issue is nicely conveyed through factors relating to fighter aircraft.

1. Operation Desert Storm

Operation Desert Storm, though not a NATO operation, nonetheless served as the first opportunity for many NATO air forces to operate together in actual combat, though quite differently than imagined during their previous 40 years in the Alliance. For the first time, key deficiencies were identified that seriously hampered combat operations, with the two most glaring being secure communications between aircraft and control platforms and the inability to identify forces as friendly or foe (IFF).[153] U.S. forces revealed impressive advancements in these areas that were rendered somewhat moot due to the necessary cooperation with their less capable allies. American forces also demonstrated great leaps ahead in such areas as precision guided munitions (PGMs), electronic countermeasures (ECM), and night vision capabilities. These innovations were largely the result of significant investment in R and D in the previous decades.[154] In addition, satellite imagery used for targeting, long range precision cruise missiles and stealth technology acted as enormous force multipliers that consequently placed the U.S.

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[152] Coonen, 77.

[153] Eric Larson, Gustav Lindstrom, Myron Hura, Ke Gardiner, Jim Keffer, and Bill Little, *The Interoperability of NATO Allied Air Forces: Supporting Case Studies* (Santa Monica: Rand Corporation, 2004), xv.

[154] Jack L. Sine II, "Organizing the Fight: Technological Determinants of Coalition Command and Control and Combat Operations" (Master's Thesis, Naval Postgraduate School, 2006), 36.

in the position of operational and tactical leader in air operations.[155] The capabilities gap had officially been identified (though it was present before), but for several reasons its significance was temporarily minimized. Firstly, NATO itself was not involved and thus avoided criticism. Also, Desert Storm was a regional conflict with little implication for Europe, and therefore America's dominance was not viewed as a threat to European sovereignty. As the decade wore on and other combat air operations were undertaken, however, this would cease to be the case.

2. Conflict in the Balkans

During the 1990's European air forces participated in smaller NATO air operations in the Balkans such as Operation DENY FLIGHT and Operation DELIBERATE FORCE. Leaders recognized the implications of the capabilities gap in these campaigns and began taking steps to implement solutions. But the small size and limited scope of the missions during these operations minimized the sense of urgency for required improvements. It wasn't until Operation ALLIED FORCE (OAF) in Kosovo from 24 March to 11 June 1999 that the seriousness of the capabilities gap was truly realized. Perhaps the most analyzed conflict of recent times, OAF gave rise to much debate and lessons learned stemming directly from the shocking divergence in capacity between the U.S. and its allies.[156] These were felt at the political, strategic, and operational levels. Fissures in the coalition and operational incompatibility gave rise to European fears of further U.S. dominance in their own regional operations or worse of being excluded entirely from future conflicts. But it was the consequences of specific

[155] Sine, 46.

[156] See Wesley K. Clark, *Waging Modern War: Bosnia, Kosovo, and the Future of Conflict* (New York: Public Affairs, 2001). This book more or less opened the debate on the repercussions of the political and strategic fallout between the U.S. and Europe during the Kosovo conflict.

capabilities at the tactical level that reverberated at the operational and strategic levels.[157] These tactical issues were exemplified in the fighter aircraft flying the sorties.

The United States possessed many capacities that distanced its fighters from those of its allies, primarily due to the "Revolution in Military Affairs" which focused on expeditionary warfare and precision strike while profiting from recent technological advances and a move toward "network centric warfare."[158] Like in Desert Storm, secure communications and IFF were once again issues, where certain allies completely lacked capability and others remained incompatible due to "stovepiped" systems developed with little forethought toward collaboration.[159] The inability to "go secure" necessitated passing target information "in the clear" at times, which led to target compromise and afforded the Serbs time to conceal or move themselves and their equipment.[160] The U.S. also possessed the lion's share of capacity in PGMs, night vision equipment, and ECM, similar to previous conflicts.[161] European air forces were criticized for a lack of multi-role capability, which caused unnecessary limitations in target planning operations.[162] Serbian concealment tactics stressed the significance of efficient C4ISR to find and quickly engage mobile targets, but once again U.S. forces were the few capable of using this critical technology and were often unable to share vital information with their coalition partners.[163] The planning cycle was so encumbered and complicated due to

[157] See John E. Peters et al., *European Contributions to Operation Allied Force: Implications for Transatlantic Cooperation* (Santa Monica: Rand Corporation, 2003), 25. For example, a lack of M capacity in non-American assets forced the U.S. to fly the majority of the more demanding sorties and consequently take charge in dictating operational and procedures such as targeting plans. See Jack L. Sine II, "Organizing the Fight: Technological Determinants of Coalition Command and Control and Combat Operations" (Master's Thesis, Naval Postgraduate School, 2006), pages 46-50 for a detailed description of the consequences of the capabilities gap in OAF. See also: Benjamin S. Lambeth, *NATO's Air War for Kosovo: Strategic and Operational Assessment* (Santa Monica: Rand Corporation, 2001), *Kosovo/Operation Allied Force After-Action Report: Report to Congress* (Washington D.C.: Department of Defense, 2000), and Paul Gallis, *Kosovo: Lessons Learned from Operation Allied Force* (Washington, D.C.: Congressional Research Service, Report #RL30374, 14 November 1999).

[158] Adams et al., *Bridging the* Gap, 2. See also Department of Defense, Office of Defense Transformation *Military Transformation: A Strategic Report* (Washington D.C.: Department of Defense, Office of Defense Transformation, 2003).

[159] Peters et al., 57.

[160] Larson et al., *The Interoperability of NATO Allied Air Forces*, 44.

[161] Paul Gallis, *Kosovo: Lessons Learned from Operation Allied Force* (Washington, D.C.: Congressional Research Service, Report #RL30374, 14 November 1999), 15.

[162] Peters et al., 102.

[163] Gallis, 24-26.

differing levels of capability and interoperability that time-sensitive targets (those fleeting enough to require quick approval to engage) were rendered almost untouchable.[164] Also, American exclusivity in stealth technology and the understandable reluctance to share its secrets led to separate planning mechanisms for the "haves" and "have-nots," yet another operational limitation stemming from the capabilities gap.[165]

European governments were concerned not only with their relative inability to contribute to the battle, but especially with the grander repercussions. The indignity of the U.S. flying 70-80 percent of OAF's missions in what amounted to a local conflict necessitated change in many European minds.[166] As mentioned above, concerns of U.S. domination in the region were mixed with fears that America would act unilaterally in the future in order to avoid the encumbrances of inept coalition partners.[167] The capabilities gap was untenable and needed urgent redressing. NATO Secretary General Lord Robertson summed up the European perspective best in 2002:

> The second reality is the increasing gap in defence capabilities between the US and its Allies. This gap was highlighted in Kosovo… Because the US has a range of military options that remain unavailable to its Allies, America's armed forces are obliged to carry the lion's share of some key combat missions and, hence, of the risks. If this gap is not addressed, we will face a political, conceptual and military divergence, which will make the transatlantic Alliance ever harder to sustain, on the battlefield and in the conference chamber.[168]

3. Post-Kosovo Improvements

Urgency was felt on both sides of the Atlantic to close the gap, at least on the surface, and U.S. prompting was greeted with swift action on the European side. NATO launched the Defense Capabilities Initiative (DCI) in late 1999 to "ensure that all allies remain not only interoperable, but that they also improve their capabilities to face the

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[164] Peters et al., 57.

[165] Sine, 42.

[166] Flournoy et al., *European Defense Integration*, 42.

[167] Stephen J. Coonen, "The Widening Military Capabilities Gap between the United States and Europe: Does it Matter?" *U.S. Army War College Quarterly* 36 (Autumn 2006): 67.

[168] Speech by NATO Secretary General Lord Robertson at GKN Farnborough Dinner, RAC Club, London, 25 July 2002, http://www.nato.int/docu/speech/2002/s020725a.htm (accessed October 2006).

new security challenges."[169] The Prague Capabilities Commitment (PCC) of 2002 defined specific areas in which NATO required improvements from its member states. Additionally, NATO formed Allied Command Transformation in June of 2003 to streamline its organization and increase efficiency to be able to "face the operational challenges of coalition warfare against the threats of the new millennium."[170] The European Security and Defense Policy soon led to an additional impetus to increase capabilities, primarily through the ECAP. NATO and the EU worked together through the Berlin Plus agreements and the NATO-EU Capability Group to identify shortfalls and ensure cooperation in meeting them.[171] Europe possessed not only the momentum but the birth of supporting organizations and bureaucracy to begin closing the capabilities gap.

Organizational pressure from above joined with military pride from below to induce air forces into taking the necessary steps to increase capabilities. Programs which existed before OAF were accelerated and implemented (such as the MLU program in the EPAF F-16 countries) to solve many of the previously identified problems. Precision weapons were purchased from the U.S. in the short term, and France in concert with several European allies commenced their own PGM programs for the long term. Air forces quickly commenced equipping and training themselves to operate at night and in adverse weather, with multi-role capacity.[172] While an overnight transformation to U.S.-level capabilities was not possible, Europe nonetheless made considerable efforts and saw significant improvements in its fighter capabilities in the five years following the conflict in Kosovo. NATO's identified areas of concern today reflect the decreased emphasis on the "fighter" capabilities, mostly due to increased emphasis in more urgent categories.[173]

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[169] Flournoy et al., *European Defense Integration*, 20.

[170] Allied Command Transformation website, http://www.act.nato.int/welcome/history.html (accessed November 2006).

[171] "The NATO-EU Strategic Partnership," in *The Istanbul Summit Media Guide*, (Brussels: NATO Publication, 2004), 3-8, http://www.nato.int/docu/comm/2004/06-istanbul/press-kit/presskit-en.pdf (accessed November 2006).

[172] Peters et al., 62.

[173] NOTE: The Prague Capabilities Commitment list of desired improvements for NATO members remains unchanged since 2002. "Combat effectiveness" through the use of precision weapons and suppression of enemy air defenses (SEAD) are on the PCC list, and the European Union reported in 2005 that M-equipped aircraft remains a capability shortfall with "significant" impact. See *The NATO Handbook 2006*, 176, and "Capability Improvement Chart I / 2005," *Council of the European Union* (Brussels: EU Press Release, 2005). The author's experience holds that M capabilities of most western European air forces are greatly improved since OAF.

Strategic airlift, active layered theater ballistic missile defense, and ground surveillance occupy a larger share of NATO's capabilities initiatives in late 2006. However, the focus area involving fighter aircraft that continues to command attention today is C4ISR.[174]

4. Interoperability Gains Steam

With an increasing emphasis placed on C4ISR and interoperability between all elements of the battlefield, NATO attempted alliance-wide standardization programs which fell under the STANAGs, or standardization agreements. The Multifunction Information Distribution System (MIDS) is an example of NATO's attempt to place all aircraft on a common data-link, which has shown success in recent years despite a lack of alliance-wide implementation.[175] MIDS is based on the U.S. Link-16 system but was developed to allow users access to a common "grid" of information providing their national equipment remained compliant. On the U.S. side this was driven by operational requirements for more effective coalition operations, while European nations desired access to U.S. technology yet preferred indigenous production versus buying it off the American shelf.[176] MIDS is recognized as a success so far within the Alliance, especially in communications between aircraft. Operations in Afghanistan have (re)emphasized the importance of aircraft communicating securely with ground troops, and improvements are consequently underway to strengthen this capability as well.[177] MIDS illustrates the transatlantic compromises common in defense collaboration today, with European programs vying to remain autonomous yet compatible with crucial U.S. technology.

A recent comprehensive study on transatlantic interoperability in C4ISR found that most countries care more about operating in conjunction with U.S. equipment than on a common European grid, yet few if any define interoperability as utilizing common equipment with their more powerful ally. The study advocated a "plug and play" approach on the European side, recommending they build certain parts of the network

[174] Flournoy et al., *European Defense Integration*, 17.

[175] NOTE: Surprisingly, STANAG compliance is not mandatory in NATO, and often nations (including the U.S.) will opt to pursue the latest available technology to achieve network centric capability rather than restrict themselves in a process that is "long, tedious, bureaucratic, and lowest common denominator." See Adams et al., *Bridging the Gap*, 89.

[176] Adams et al., *Bridging the Gap*, 86.

[177] Ibid., 149.

themselves that will remain compatible with and easily connected to the U.S. system. This would allow them to utilize surveillance and reconnaissance products such as target data and satellite feeds offered by the more advanced American system.[178] However, the limits of this type of interoperability remain a crucial issue for further collaboration, especially when considering the technology present in fighter aircraft. The following points illustrate "plug and play" to be an over-simplified approach.

Interoperability is not as simple as common access to data but rather should be viewed holistically in terms of common strategies, operational cultures, and battlefield tactics.[179] Merely plugging into "the grid" does not guarantee coalition partners the ability to fight efficiently upon arrival in the modern theatre of war.[180] Additionally, a key assumption in the plug and play approach involves U.S. ability and willingness to share data acquired through its superior ISR technology. Sensitive technology ensures the U.S. of political and operational influence over its allies, as previously discussed, and is not easily relinquished due to existing export control laws or the desire to keep the current balance of power. Even if the U.S. desired to share its most sophisticated ISR data it will likely require years of development before availability to operators of non-U.S. equipment is feasible. Current operations in Afghanistan vindicate this view, as a good deal of U.S. data remains inaccessible to NATO allies.[181] Lastly, interoperability demands a certain amount of infrastructure support for common equipment that is unavailable to airframes of different origins. For example, all NATO F-16 operators utilize the FalconView mission planning software which greatly simplifies multinational missions and enables missions simply not possible with differing airframes.[182] These

[178] Adams et al., *Bridging the Gap*, 144-150.

[179] NOTE: Ethan B. Kapstein categorizes interoperability as either complementarity (country X does one job, country Y another), commonality (X and Y operate identical platforms) , interchangeability (X can substitute their equipment for Y's), or compatibility (X and Y's equipment can operate together with degradation in capability). See Ethan B. Kapstein, "Capturing Fortress Europe: International Collaboration and the Joint Strike Fighter," *Survival* 46 (Autumn 2004): 144.

[180] David R. Scruggs and Guy Ben-Ari interview.

[181] Major Jack Sine, former Chief, Air Superiority Weapons Requirements, Weapons Division, Directorate of Operational Capability Requirements, Deputy Chief of Staff for Air and Space Operations, Headquarters U.S. Air Force, personal interview by the author, Monterey, CA, 14 November 2006.

[182] Author's personal experience as an F-16 pilot in NATO operations.

arguments suggest a distinct advantage to operating U.S. equipment which must not be discounted by decision-makers making interoperability-based procurement choices.

5. American Interoperability with European Equipment?

The question of whether to buy an American aircraft in order to remain fully interoperable is linked with current wisdom regarding rectification of the capabilities problem. Most analysts agree on the need for increased defense spending from European governments but in a more cohesive and rational manner, with emphasis on research and development. Some have suggested the "niche" approach, where respective national defense industries concentrate on those areas in which they excel yet continue to integrate on both a trans-European and transatlantic plane.[183] This implies the ability to purchase European hardware yet remain fully capable and interoperable with U.S. equipment. Most experts agree that standardization and interoperability will strengthen European military capabilities and that NATO is the logical avenue for this undertaking. NATO has continually advocated further cooperation between U.S. and European defense industrial bases and a loosening of U.S. export controls on sensitive technologies, with a recent emphasis on collaboration in C4ISR.[184] This is not to imply that American technology can only be accessed through purchase of its equipment, and certainly leaves the door open for European projects which may include more U.S. technology. Few would disagree that further defense cooperation and some sharing of U.S. technology combined with increased spending on the European side would help minimize the capabilities gap. However, as addressed above, the U.S. not only demands operational capability from its coalition partners, but hopes to achieve this through the sale of American equipment while keeping some degree of political and operational influence by closely guarding its superior technology. Therefore, additional U.S. technology will likely find its way to Europe only in a U.S.-led program. Thus, the question of required capabilities in Europe's prospective fighters, when taken in the context of "full" interoperability with

[183] Flournoy et al., *European Defense Integration*, 57.

[184] See Lord Robertson speech, 25 July 2002; also James Appathurai, "Closing the Capabilities Gap," *NATO Review*, Autumn 2002, and *The NATO Handbook*, 175-176.

available battlefield assets (i.e. American ones), already points decision-makers across the Atlantic. And that neglects the largest differentiating capability between the two sides: stealth technology.

6. Stealth As the Delineator

Stealth technology seeks to prevent an aircraft's detection by the enemy through reduced infrared, visual, and acoustic signatures. The most important tool in lessening the chances of detection is the reduction of an aircraft's radar cross section (RCS). This can prevent detection by an enemy fighter's radar and allow the first shot in a modern air battle but perhaps more importantly offers virtual invisibility to increasingly sophisticated air defense systems and surface to air missiles (SAMs). The U.S. began producing low observable (LO) aircraft in the 1960's, with a great deal of R and D undertaken in the 1970's to apply the technology to tactical fighters and bombers. Today America holds a virtual monopoly on this technology and currently produces the only VLO (very low observable) supersonic fighter operational in the world with the F-22 Raptor.

Not only have European aircraft manufacturers been left out of the stealth revolution, but much of it has been concentrated in one American company. Lockheed Martin produced stealth aircraft such as the SR-71 reconnaissance plane of the 1960's, the F-117 Nighthawk in the 1980's, and the F-22 today.[185] Its stronghold on stealth R and D and technology continues in Lockheed's F-35 Lightning II, also classified as a VLO fighter.[186] Stealth is the most important reason the F-35 (JSF) is classified as a 5th-generation aircraft, unlike its competitors currently on the market. And as virtually the only firm to have produced true stealth fighters since the 1970's it is safe to say that Lockheed will ensure American dominance in this all-important field for some time to come. This could well serve as the deciding factor between European fighter options and their stealthy American counterpart.

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[185] Mark A. Lorell, and Hugh P. Leveau, *The Cutting Edge: A Half Century of Fighter Rand*D (Santa Monica: Rand Corporation, 1998), 129-149.

[186] NOTE: The Joint Strike Fighter, or JSF, was renamed the F-35 Lightning II in July of 2006. From this point forward, the terms "Joint Strike Fighter," "JSF," and "F-35" will be used synonymously for the same aircraft.

In sum, fighter aircraft continued to evolve in the post-Cold War period with the U.S. Revolution in Military Affairs continuously introducing capabilities that Europe found difficult to match. The wake-up call in Kosovo was met with increased capacities in night vision equipment, PGMs, and all-weather aircraft and weapons. Some pressure to improve came from NATO, some from the European Union, and the U.S. itself offered impetus both explicitly and through unspoken threats of "going it alone" in future conflicts. But no sooner did Europe feel it had caught up than the *interoperability* of equipment took on increased importance, with air forces scrambling to ensure a place on the U.S.-owned secure network. This gave rise to debates as to the true definition of interoperability, with American technology advancing so quickly and unilaterally that perhaps the only way to be ensured a continued place in the war planning room was by joining the "U.S. Club" and subscribing to American equipment and tactics. Those who profess that equal capabilities with the U.S. can be achieved through European equipment that plugs into the American grid are unable to rationalize the absence of stealth capability in current European fighter designs. It seems that despite their best efforts, Europeans are continuously outdone by the enormous American R and D budgets. A capabilities-centric study of fighter aircraft currently available illustrates such a chasm.

7. Available Fighter Aircraft and Corresponding Capabilities

Numerous European governments are hoping to replace at least part of their current fighter fleets within the next 10 years. Though certainly not the only category affecting their decisions, aircraft capabilities will play a large role in the choices, particularly given the recent advances in network centric warfare and U.S. battlefield technology. Solely from a capabilities perspective, fighter aircraft procurement is an intricate process with many variables entering the picture, perhaps the most important being the ability to defeat anticipated threats. Other factors such as range, speed, maneuverability, and weapons capacity play a role depending on the anticipated mission such as air defense or ground attack. Also, less easily measurable criteria enter the equation, such as electronic attack and defensive capabilities, radar capabilities, sensor integration, and of course stealthiness. In the end, the aircraft with the capability to

survive while accomplishing the mission at the lowest price would win the competition in the absence of other factors. The fighter designs currently available for purchase by European governments demonstrate distinct differences in capabilities.

The fighter jet market today is strikingly similar to 1975, with European governments deciding between a French, Swedish, European, and American plane. The French-made Dassault Rafale followed a similar design timeline as the Eurofighter, a joint project between the UK, Germany, Spain, and Italy. Both were designed in the mid-1980's and are only now entering operational service in their respective air forces. The Swedish-made Gripen, like the Rafale and Eurofighter, is a 4th-generation fighter which has seen service in different versions since 1997. The F-35 Lightning II (aka the Joint Strike Fighter) is the only 5th-generation fighter on the market, meaning it "incorporates all the technology and stealth of previous generations plus network-centric warfare capability." Unlike 4th generation fighters, which employ ad-hoc solutions to increase stealth and information presentation to the pilot, a 5th generation aircraft integrates all into a seamless product which can plug into the global information grid.[187]

In terms of airframe performance, the Eurofighter and Rafale are quite similar. Both are highly maneuverable and venerable in a close-in fight, while sporting top speeds of Mach 2.0+. The Gripen does not sell its maneuverability compared to the other two, but also lists a top speed of Mach 2.0+. The F-35 will be slightly less maneuverable than the others and claims a top speed of Mach 1.6, but its range is hailed as superior to its competitors, especially compared with the Gripen.[188] Jane's reports a combat radius in the Gripen of 432 nm, significantly less than its competitors, but this will be increased if special versions of the aircraft are built for Denmark and Norway in 2010. If range and agility are the deciding factors for airframe performance, data shows the F-35 edging the Rafale on range and the Typhoon and Rafale taking the agility contest.

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[187] Col. Richard Harris, Chief, Office of Defense Cooperation, U.S. Embassy Oslo, Norway, interactive forum, *Dagbladet Online*, http://www.dagbladet.no/nyheter/2006/05/01/464964.html (accessed August 2006).

[188] See Harold C. Hutchinson, "F-35 News: Why Australia went with the F-35," *F-16.net website*, http://www.f-16.net/news_article1519.html (accessed March 2006), Gripen website, http://www.gripen.com/en/GripenFighter/TechnicalSummary.htm, (accessed November 2006), Jane's All the World's Aircraft, www.Janes.com (accessed November 2006), and Col. Richard Harris interactive forum.

Weapons carrying capacity remains fairly constant across the three 4th generation fighters. The Typhoon was originally designed as an air superiority fighter but future upgrades to "Tranche 2" will render the aircraft capable of carrying the latest in air-to-air and air-to-ground precision weapons. The Rafale was optimized for air-to-ground delivery from its inception with quite capable air superiority abilities as well, and the Gripen will almost match the air-to-ground capability of its European counterparts. The only significant difference between the four aircraft in this regard is a diminished quantity of weapons carriage in the F-35, but this is owed to its internal weapons design which is a significant contributor to its stealth qualities. However, the option to carry weapons and fuel tanks externally exists if LO capability is not essential for a mission.[189] Regardless, the F-35 will carry significantly less air-to-air ordnance than the others, due to its design as a strike platform.

The Rafale, Gripen, and Typhoon are fairly well-balanced in terms of electronic capabilities. All sport similar avionics suites with capable Pulse Doppler radars that will be upgraded to active electronically scanned arrays (AESA, much more capable radars) in the coming five years. The Eurofighter and Rafale tout MIDS data-links (fully NATO-compliant and compatible with U.S. Link-16) while the Gripen possesses "the world's most highly developed data link," but does not claim MIDS compliance. All three aircraft either possess or will soon hype advanced targeting pods with electro-optical and infrared capabilities, but advanced defensive suites containing missile and laser warnings and advanced electronic warfare (EW) abilities are either currently unfunded or still five years away from operational status. The Eurofighter seems to be the better funded aircraft for such advanced electronic capacities.[190] What is significant about the three aircraft's advanced technological capabilities is their ad hoc nature and lack of integration from the design phase. This also requires many of the "add-ons" to be found on the exterior of the aircraft, such as advanced targeting pods, which increases drag and observability to

[189] See Joint Strike Fighter Website, http://www.jsf.mil/f35/f35_technology.htm, (accessed November 2006).

[190] Jane's Website, http://www.Jane's.com (accessed November 2006), and Gripen Website, http://www.gripen.com/en/GripenFighter/TechnicalSummary.htm (accessed November 2006).

enemy radars. While they will certainly be impressive aircraft when operational to their full capacity (assuming they will be funded to that level), the lack of total sensor integration is largely what will keep them classified as 4th generation fighters.

The F-35, if somewhat equal or even inferior in airframe performance and weapons capacity, is set to far outshine its 4th generation competitors in the technological capabilities realm. While still in the System Design and Development (SDD) phase, the merits of having an additional 7-10 years over its competitors to incorporate critical technological advances are already apparent. The fact that all systems are designed and integrated concurrently from the program inception will constitute perhaps the largest advantage over its competition. For example, the EW system will function as a defensive radar warning receiver, countermeasure dispenser, and electronic surveillance measures (ESM) system, which prevents the need to add features to the system at a later date. In lieu of adding a targeting pod to the aircraft after its initial design phase, the F-35 will sport a fully integrated and internal electro-optical targeting system (EOTS) capable of both advanced targeting and reconnaissance features.[191] The AN/APG 81 active electronically scanned array (AESA) radar was integrated at the origin of the program, profiting from U.S. technological dominance in this area and offering not only all-weather target detection but also identification. Missile and laser warnings will also come as standard equipment on the aircraft.[192] According to the F-35 website, it will "have the most robust communications suite of any fighter aircraft built to date. The F-35 will be the first fighter to possess a satellite communications capability that integrates beyond line of sight communications throughout the spectrum of missions it is tasked to perform."[193]

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[191] Bill Sweetman, "Technology Drives US Joint Strike Fighter Programme to the Limit," *International Defence Review*, 1 November 2006.

[192] Joris Janssen, "JSF is best option for future threats, argues RNLAF," *Jane's Defense Weekly*, 15 November 2006.

[193] Joint Strike Fighter website, http://www.jsf.mil/f35/f35_technology.htm (accessed November 2006).

The advanced "sensor fusion" compared to its competitors will exclusively allow the F-35 to serve as not only a strike aircraft, but an ISR platform as well. The importance of this capability on today's network centric battlefield cannot be understated. As Secretary of the Air Force Michael Wynne recently stated:

> The F-35 Lightning II will bring added sensor-fused targeting, situational awareness, and persistence to the Joint and Coalition Team, with all-weather, precision air-to-surface employment across the spectrum of missions. This team delivers us access and brings an added dimension that the F-15/F-16 mix could not - these new fighters will be our front-line ISR platforms. With access to airspace that traditional ISR platforms do not have due to the threat environment, they will "Hoover up" all kinds of data, bringing our warfighters Spherical Situational Awareness.[194]

Earlier this year, funding was canceled for the E-10A program, a platform slated to integrate and improve upon the C2 and ISR missions of the AWACS and JSTARS with a single aircraft. A recent article in Aerospace Daily described the F-35 as "touted by some program officials as 'our own little EA-6B, JSTARS and AWACS.' That means it is capable of jamming signals and communications, providing command and control and conducting long-range air-to-air and air-to-ground surveillance."[195] The U.S. Marine's Deputy Commandant for Aviation described the platform as being able to "jam enemy radars, perform surveillance, stream data and battlefield videos to troops on the ground, and serve as a link to spy drones and satellites."[196] While a good deal of the F-35's capabilities are understandably classified, the fact remains that none of its European competitors will come close to its ability to gather information and disseminate it to not only its pilot but virtually all other assets on the battlefield.

The precarious issue of determining aircraft cost of course enters the process when evaluating relative capabilities of potential choices. Falling under the "it depends who you ask" category, there are wildly differing views on the actual price of these four ultra-competitive programs. The Gripen marketers claim it to be the cheapest, at $40

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[194] Speech by Secretary of the Air Force Michael Wynne, Johns Hopkins University, Baltimore, MD, 19 October 2006, http://www.af.mil/library/speeches/speech.asp?id=281 (accessed November 2006).

[195] "JSF cuts possible as 2008 budget drafted," *Aerospace Daily and Defense Report*, 31 October 2006, http://aimpoints.hq.af.mil/display.cfm?id=14764 (accessed November 2006).

[196] Richard Whittle, "Lockheed's F-35 Has Date With Sky Set For Next Week," *Dallas Morning News*, 8 December 2006.

million per plane, while the Eurofighter and Rafale are repeatedly singled out as overpriced and under capable by those selling the F-35. But as the F-35 is much earlier in its design process and the only aircraft not in operation in any air force at the time of writing, its price continues to increase and not surprisingly takes on less importance as a selling point as the program continues to develop. Lockheed Martin has stated the cost for purchasing their product will not be determined until three years before the actual procurement, a milestone still some years away. Reasons for varying prices on the four competitors comprise the inclusion of R and D costs, estimated maintenance and weapons costs over the lifetime of an aircraft, the addition of Value Added Tax (VAT) on European jets, and offset prices due to industrial participation offered to purchasing countries.

A recent study conducted by Defense-aerospace attempted to arrive at objective figures for per-aircraft cost of all Western fighters currently on the market. It made extensive use of various government reports while avoiding numbers published by aircraft manufacturers (though the companies were allowed to rebut the conclusions at the end of the study). Table 2 shows the best summary currently available for comparing the four aircraft, shown as unit procurement costs (per aircraft price not including R and D), program unit costs (which include R and D) and price per kilogram (the closest measurable number to capability vs. cost). While tough to draw conclusions due to the aforementioned limitations of such numbers, it is certainly arguable that the F-35 will qualify as the best aircraft for the money. It is important to note as well that a greater industrial participation package will offset the costs of a program and likely exceed it many times over.

Table 2. Cost comparison of Western Fighters Currently For Sale

Aircraft	Unit Procurement Cost [5]	Program Unit Cost [6]	Weighted Cost [7]	Cost per Kilogram [8]
Eurofighter [1]	$118.6M	$143.8M	$112.5M	$14,748
Rafale C [2]	$62.1M	$135.8M	$55.7M	$14,446
Gripen [3]	$68.9M	$76.07M	$84.0M	$13,345
F-35 Lightning II [4]	$115.0M	$112.5M	$115.0M	$9,375

Source: "Sticker Shock: Estimating the Real Cost of Modern Fighter Aircraft."
An occasional report by defense-aerospace.com

Note 1: Prices shown are for the UK version, the Eurofighter Typhoon.

Note 2: The Rafale C is the single-seat conventional takeoff and landing used by the French Air Force.

Note 3: Prices shown are for the C Model Gripen offered to Poland in a 2002 bid. This was the only aircraft with published export figures, but includes some offset entitlements.

Note 4: Prices shown are the Low Rate Initial Production (LRIP) estimate.

Note 5: Obtained by dividing the latest production contract by number of aircraft ordered, thus excluding most R and D costs.

Note 6: Includes R and D costs and most ancillary costs such as support equipment and spare parts. This is generally accepted as the most accurate gauge of per-aircraft cost.

Note 7: Converted into Purchasing Power Parity to dispel differences in costs of labor and materials in different countries. See The Economist, http://www.economist.com/markets/bigmac. (Accessed November 2006).

Note 8: Fighters are generally considered to "cost what they weigh," making this figure a rough estimate of cost versus capabilities.

To this point several conclusions can be reached. Firstly, even if the EU (through the European Defense Agency) succeeds in its push for a common defense market which largely excludes the U.S., it will be years before such a venture is achieved. More importantly, this kind of initiative is dominated by the larger nations with powerful defense industries and will drive the smaller nations toward further collaboration with America. Second, the EDA plan (if true) is flawed, as transatlantic collaboration is essential to the survival of defense industrial bases on both sides of the Atlantic. This is perhaps more imperative for industries in smaller European countries that are unable to compete in the crowded European market and see greater opportunities with the American defense industrial behemoth. Third, the smaller EPAF nations who purchased and flew the F-16 together experienced overwhelmingly positive results from a capabilities, interoperability (in both equipment and tactics), and industrial perspective. The service life of their aircraft will be met in roughly the next 8-15 years, necessitating a replacement decision. Fourth, these nations will most likely replace their aging fighters with newer ones (though debates are still ongoing in several countries) and the field has effectively been narrowed to three choices.[197] Fifth, the F-35 Lightning II (Joint Strike Fighter) promises to be the most capable of the three, especially in the critical categories of sensor fusion and stealth technology. It arguably holds the best "bang for the buck" as well, though its final cost is yet to be determined. Finally, based on its superior capacities in ISR and undetected precision strike, maximum allied operation in the F-35 has the potential to both reduce the current capabilities gap and encourage multilateralism in future aerial coalition warfare. From these preliminary conclusions the question arises for those smaller European nations currently in the fighter market: Why not the JSF?

[197] NOTE: In truth, the Rafale has been effectively eliminated from competition in both Denmark and Norway, leaving it a three-way race between the JSF, Eurofighter, and Gripen.

Table 3. Summary of Factors Influencing Government Fighter Procurement Decisions

Political Issues	Industrial factors	Military Influence
• Relations with U.S. • Pressure to buy European products • European or Atlantic view on relations • Public importance placed on military • Domestic budgetary constraints and priorities	• Ability to produce indigenously • Access to U.S. technology • Previous experience (i.e. F-16 program) • Civilian vs. military emphasis in aerospace sector • Niche capabilities	• Capabilities required to meet threat • Importance placed on interoperability with U.S. • Experience with previous fighters (i.e. in the F-16 program)

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IV. JOINT STRIKE FIGHTER AS THE PARADIGM

Many advantages in the realms of bi-lateral diplomacy, industrial policy, alliance cohesion and operational effectiveness adhere to a multi-national participation in the JSF program. This section suggests the exemplary political, strategic and operational benefits of the program and offers this case study to determine the procurement rationale of four key NATO members. The aircraft is unmatched as a fighter in the areas of sensor fusion and stealth; moreover, it acts as the key node to the information grid and the "gatekeeper of interoperability" on the network centric battlefield of the present. Acquisition of the aircraft ostensibly offers allies diplomatic advantages in the form of favor from the U.S. administration and Congress; while from the stand point of industrial policy, the new plane offers advantages of participation in manufacturing and possible technology transfers of great merit to indigenous contractors. Nonetheless, in contrast to the past certain European F-16 countries have refrained from participation in the program, and those that are involved may elect not to continue for various reasons analyzed below. A look at the program itself and at wider issues for partner countries will offer insight into their reluctance. Further, the present examination speculates on the significance of the Joint Strike Fighter for Alliance cohesion and Alliance maintenance. This section will focus on the EPAF countries of Belgium, Denmark, the Netherlands, and Norway, with supporting evidence offered from narratives of other nations as well.

A. JOINT STRIKE FIGHTER PROGRAM

The JSF program began in 1996 (then known as the Joint Advanced Strike Technology Program) in the U.S. Department of Defense as a response to anticipated threat scenarios and enemy capabilities. A main goal of the program from the U.S. perspective has been to find further ways to reduce costs, given the shrinking defense budgets and increasing price of high technology components. The aircraft offers "affordable next generation strike aircraft weapon systems for the Navy, Air Force, Marines, and our allies. The focus of the program is affordability - reducing the development cost, production cost, and cost of ownership of the JSF family of

aircraft."[198] In order to achieve this welcome set of goals, commonality among the services was essential, and the aircraft is now set to replace F-18 C/D's of the Navy and Marines, AV/8B Harriers of the Marines, and F-16 and A-10 fighters from the Air Force. Current plans call for 2,458 aircraft in three different versions, but with 70-90% commonality of components and systems to reduce manufacturing costs.[199]

Another crucial aspect designed to reduce costs of the program has been international partner participation. According to a recent GAO report:

> The program is expected to benefit the United States by reducing its share of program costs, giving it access to foreign industrial capabilities, and improving interoperability with allied militaries. Partner governments expect to benefit from defined influence over aircraft requirements, improved relationships with aerospace companies and access to JSF program data.[200]

Eight countries joined the JSF System Design and Development (SDD) phase in 2002, at differing "tiers," or levels, depending on the amount invested in the program. (See Figure 2) This does not obligate a country to buy the aircraft at a later date, nor does it prevent other nations from buying "off the shelf" through the Foreign Military Sales (FMS) program in the future. At the time of writing in November 2006, the partner countries are considering signing the Production Sustainment and Follow-on Development (PSFD) Memorandum of Understanding, which essentially continues partnership in the program as it moves toward testing, evaluating, and producing the aircraft.[201] It's the next phase of the program, not committing to a buy, but very close to it. The JSF program, the largest collaborative defense venture in history (currently valued at $276 billion), is the first transatlantic *co-development* project undertaken for fighter aircraft, with the Pentagon

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[198] JSF International Program Website, http://www.jsf.mil/program/index.htm (accessed November 2006).

[199] Christopher Bolkom, *F-35 Joint Strike Fighter Program: Background, Status, and Issues* (Washington D.C.: Congressional Research Service, Report #RL30563, 2 June 2006), 1-3. NOTE: Common fighters between the services were attempted, notably the TFX under defense secretary McNamara but eventually abandoned due to the inability to create a true multi-role aircraft at the time. Advances in materials technology and manufacturing have now rendered this possible. See page 29.

[200] *Joint Strike Fighter Acquisition: Cooperative Program needs Greater Oversight to Ensure Goals are Met*, (Washington D.C.: General Accounting Office, GAO-03-775, 21 July 2003), 1-2.

[201] See F-35 II Website, http://www.jsf.mil/index.htm (accessed December 2006) and Andy Nativi and Douglas Barrie, "Europeans Earmark Billions for JSF," *Aviation Week and Space Technology*, 220, 21 November 2006, 4.

sensibly relying on foreign participation not only in financing but also design.[202] In fact, primarily due to Marine interest in a Short Takeoff and Vertical Landing (STOVL) version for Harrier replacement, the UK entered as a full collaborative partner bringing valuable expertise in such areas and in reversal of what had been in earlier decades a predatory relationship to the detriment of the UK.

Figure 2: JSF Partner Financial Contributions and Estimated Aircraft Purchases

Dollars in millions

	System development and demonstration			Production	
Partner country	Partner level	Financial contributions[a]	Percentage of total costs	Projected quantities[b]	Percentage of total quantities
United Kingdom	Level I	$2,056	5.1	150	4.7
Italy	Level II	$1,028	2.5	131	4.1
Netherlands	Level II	$800	2.0	85	2.7
Turkey	Level III	$175	0.4	100	3.2
Australia	Level III	$144	0.4	100	3.2
Norway	Level III	$122	0.3	48	1.5
Denmark	Level III	$110	0.3	48	1.5
Canada	Level III	$100	0.2	60	1.9
Total partner		**$4,535**	**11.2**	**722**	**22.8**
United States		$35,965	88.8	2,443	77.2

Sources: DOD and JSF Program Office.

[a]Chart values do not reflect nonfinancial contributions from partners.

[b]Partner quantities are preliminary and were developed for U.S. planning purposes. The estimates were developed by the United States in collaboration with partner countries, but no specific national agreements or arrangements have been established with partner countries for production; therefore, these projected production quantities are subject to change.

Figure 2. JSF Partner Financial Contributions and Estimated Aircraft Purchases

Source: *Joint Strike Fighter Acquisition: Cooperative Program needs Greater Oversight to Ensure Goals are Met*, (Washington D.C.: General Accounting Office, GAO-03-775, 21 July 2003), 10.

Members of particular interest for this study are the EPAF countries of Denmark, the Netherlands, and Norway as participating Tier 2 and Tier 3 partners (who seek replacements for their F-16's) and, in contrast, the absence of Belgium from the program as the remaining original EPAF member from the 1970's. Advantages for these nations to investing in the SDD phase include a greater say in the design requirements of the aircraft, access to the first models off the production line, and the chance to recoup

[202] Ethan B. Kapstein, "Capturing Fortress Europe: International Collaboration and the Joint Strike Fighter," *Survival* 46 (Autumn 2004): 143.

investment (a percentage of the sales proceeds) on future JSF sales, a significant advantage over FMS customers. Perhaps the biggest benefit of entry at the SDD phase is the large amount of industrial work available to the national aerospace companies of partner countries.[203] The JSF project would "provide foreign partners with a windfall opportunity to acquire American defense technology, while promoting aerospace-related jobs at home."[204]

The industrial participation aspect of the JSF program is unprecedented in large programs of this sort. In such co-production ventures as the F-104G and the F-16 MNFP, industrial "offsets" generally were assigned commensurate with a nation's financial contributions to the program, but the JSF model is built on a "best value" approach.[205] Under this construct, Lockheed Martin acts as the lead contractor for the entire program but assigns subcontracting work based on a competitive sourcing process. Industrial partners both foreign and domestic must "qualify for participation through demonstration of world-class products and technologies representing cost advantages to the program."[206] The suppliers must meet certain benchmarks, while a failure to do so results in "opening themselves to re-competition."[207] Lockheed Martin acts independently of the U.S. government in assigning competitive subcontracts and does so without regard to country of origin, instead basing awards on such factors as the ability of a company's management structure to meet JSF schedules, reducing production and design costs within acceptable risk levels, and searching for opportunities for technical improvements.[208] A program of this nature represents a significant departure from standard offset arrangements that European nations are accustomed to with U.S.

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[203] Col. E.T. Pedersen, Royal Danish Air Force National Deputy, Joint Strike Fighter Program Office, personal interview by author, JSF Program Office, Washington D.C., 2 and 3 October 2006. See also Bolkom, *F-35 Joint Strike Fighter Program*, 21, and Suzanne Patrick, *Testimony before the Subcommittee on National Security, Emerging Threats, and International Relations*, U.S. House of Representatives, 21 July 2003.

[204] Kapstein, "Capturing Fortress Europe," 149.

[205] *Joint Strike Fighter Acquisition*, GAO report, 21.

[206] *JSF International Participation: A Study of Country Approaches and Financial Impacts on Foreign Suppliers* (Washington D.C.: Department of Defense, Office of the Deputy Undersecretary of Defense for Industrial Policy, June 2003), 13.

[207] Ibid., 13.

[208] *Joint Strike Fighter Acquisition*, GAO Report, 23.

programs; but such reforms appear to solve the problem of inefficiencies the U.S. often encountered in foreign production by instead rewarding winning companies with the opportunity to reap more benefits from a contract with efficient production.[209]

From the perspective of U.S. policy and strategy, there are several key reasons to promote partner participation. The JSF program offers not only a capable aircraft that will decrease costs through its commonality among the services, but the international nature of the program all but ensures its survival from the ax of Congress.[210] In addition, if likely coalition partners in future conflicts purchase the aircraft, holistic interoperability in terms of communications, data sharing, and common tactics is all but guaranteed, increasing the combat effectiveness of all parties. From an American grand strategy viewpoint, allies that operate a U.S.-designed aircraft infused with U.S. stealth technology will (despite being quite capable on the battlefield) remain somewhat deferential to the American operational mindset and tactics, thereby ensuring continued influence for the United States. Lastly, economic interests for U.S. industry remain enormous, as the JSF not only offers several prospective sales in Europe worth multiple billions of dollars, it also represents the continuing footprint of the American fighter industry on the European continent. Additionally, American industry prefers a model international program where all partners are satisfied and purchase maximum numbers of the aircraft in order to showcase the advantages to future FMS sales recipients.

Thus, the Joint Strike Fighter international program from the U.S. perspective and, to be sure, that of this author as a witness of the benefits of multi-national use aircraft, represents a gainful and profitable approach for parties on both sides of the Atlantic. However, for what to them must be compelling reasons of politics, strategy, and

[209] NOTE: Collaborative defense projects that rely on foreign industrial participation have witnessed major complications due to the inability of partner companies to meet required standards for production. A recent upgrade to a major weapons program (which remains unnamed in this study due to the sensitive political nature) was undertaken as a three-nation consortium with the U.S. acting as an equal partner. One nation's industry proved unable to provide the needed software and in essence held the program hostage for additional funds. In the end, the program was cancelled and the weapons system was forced to go without this upgrade. As recounted by Maj. Jack Sine, former Chief, Air Superiority Weapons Requirements, Weapons Division, Directorate of Operational Capability Requirements, Deputy Chief of Staff for Air and Space Operations, Headquarters U.S. Air Force, in a personal interview by the author, Monterey, CA, 14 November 2006.

[210] Kapstein, "Capturing Fortress Europe," 147. The argument holds that cancelling a program on which key foreign air forces are investing a substantial portion of their defense budgets would bring political costs too heavy to pay.

national specifics, certain continental European governments of the early-21st century (or factions therein) do not share the enthusiasm of the JSF program office. Their objections to the program - or outright abstention from it - start to shed light on transatlantic issues at hand.

B. PARTNER NATION ISSUES

The above analysis has treated a wide variety of such issues as grand strategy, the technical progress of the weapons in the air, industrial policy and past efforts to square the aerospace circle in the North Atlantic area. Included in this analysis were transatlantic political issues and domestic ones as yet unknown. Here pressures operate to maintain the capability for combat in air, on a national and perhaps from an EU standpoint. Industrial base concerns were examined, especially for smaller countries unable to indigenously produce their own aircraft, and must look to larger countries and across the ocean. Also, tendencies to continue collaborative programs such as the F-16 which also offered interoperability and combat commonality with the Alliance's most influential partner have been addressed. Now those issues will be examined in the context of the JSF, specifically those countries whose F-16s are approaching the end of the service lives in the next decade.

1. Political Issues

The acquisition of combat aircraft represents a civil-military process of particular political virulence, given the public visibility of the programs, the long service lives (typically spanning 30-40 years), and the substantial portion they occupy in defense budgets, most of all in smaller nations. Examples from 2004-2006 illustrate the political issues which arise in such undertakings. Saudi Arabia signed a deal in August of 2006 to purchase 48 Eurofighters from the UK's BAE systems, but at the time of writing have placed the deal on hold in retaliation for an ongoing UK bribery investigation stemming from earlier fighter contracts with Saudi Arabia. The investigation will soon reveal the names of high ranking Saudis for whom alleged slush funds were established in order to ensure the sale, with political implications large enough to threaten the suspension of

diplomatic relations between the two kingdoms.[211] Russia has joined the competition with France, Sweden, the U.S., and the Eurofighter group for India's next fighter purchase of 126 multi-role combat aircraft, and the Indian decision will have certain geopolitical and strategic implications.[212] An inherent problem with analyzing the rationale behind political decisions lies in the inability to unearth the true factors which influenced such decisions, as well as the relative weight placed on these factors. This will be examined now with the information at hand.

a. Transatlantic Level

A nation's relationship with the U.S. greatly affects the issue at hand, and the decision to purchase an American fighter or not. There certainly exists the possibility that the recent transatlantic "rift" over the Iraq War continues to bring lingering consequences in the defense procurement business. Those nations who object to U.S. action in Iraq, seem to be migrating toward non-American choices when offered the option to do so in defense purchases. Denmark and the Netherlands both profess strong relationships with the U.S. and both contributed military forces to Operation Iraqi Freedom and Operation Enduring Freedom, the U.S.-led operation in Afghanistan which preceded NATO's ISAF.[213] The Netherlands was the first to sign the most recent MOU to continue in the JSF program, and Denmark appears to be a strong possibility for a purchase of the jet in the coming years.[214]

Norway's relationship with the U.S. has been strained over the Iraq War, more so since a center-left government took power in October of 2005. Prime Minister Kjell Magne Bondevik informed President Bush in March of 2003 of Norway's intention

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[211] "Shifting Sand: Saudi Arms Deal," *The Economist*, 2 December 2006.

[212] "Indian Army Chief to Visit Moscow 20 August to 'reaffirm' Strategic Ties with Russia," *The Times of India*, English Version, 18 August 06, http://timesofindia.indiatimes.com (accessed November 2006).

[213] See Danish Military Liaison Team to U.S. Central Command website, http://www.centcom.mil/sites/uscentcom1/CoalitionPages/denmark/Denmark.htm (accessed November 2006) and the Netherlands website on same, http://www.centcom.mil/sites/uscentcom1/CoalitionPages/Netherlands/netherlands.htm (accessed November 2006).

[214] Nativi and Barrie, 4.

to send only humanitarian troops to Iraq in the event of conflict due to disagreements over the legitimate use of force without UN mandates. The first motion of the new government in 2005 involved the withdrawal of those troops as well as forces supporting OEF in Afghanistan.[215] The U.S./Norway relationship has shown strains through the JSF program at times as well, most notably in May of 2006 following Norwegian anger at U.S. Ambassador Benson K. Whitney's remarks insinuating U.S. pressure to purchase the aircraft. The situation was somewhat resolved after some diplomatic exchanges, with Norway agreeing to remain in the program but a spokesman for the Defense Ministry tellingly remarking, "If we end up buying fighter jets other than the JSF, it doesn't mean we're turning our back on the U.S."[216]

Belgium joined Germany and France as vocal critics of the war in Iraq, refusing to take part in the planning for the possible defense of Turkey during Operation IRAQI FREEDOM.[217] On the 6th of March of 2003, Belgian Minister of Defense André Flahaut declared that in the event of an "illegal" U.S. invasion of Iraq, no American ships would transit Belgian ports, and no American aircraft would transit Belgian airspace.[218] Matters worsened after combat operations began as war-crimes lawsuits were filed against high-level Americans such as Secretary of State Colin Powell in Belgian courts under an obscure law allowing such litigation from foreign sources. The U.S. retaliated with threats to withhold NATO funding for a new headquarters, among other diplomatic tools, and Belgium quickly changed the law to mitigate the damage.[219] Relations have

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[215] See "Norwegian PM Talks to President Bush," *News of Norway*, 14 March 2003, http://www.norway.org/News/archive/2003/200301bush.htm (accessed November 2006) and "Norway's Coalition to Pull Troops from Iraq," *International Herald Tribune*, 13 October 2005, http://www.iht.com/articles/2005/10/13/news/norway.php (accessed November 2006).

[216] "U.S. Keeps Pressuring Norway to Buy Joint Strike Fighter Jets," *Oslo Aftenposten*, English Version, 23 May 2006, http://www.aftenposten.no/english/local/article1327310.ece (accessed November 2006).

[217] "NATO Divided," *The Economist*, 12 February 2003, http://www.economist.com/agenda/displayStory.cfm?story_id=1576270 (accessed November 2006).

[218] "La Belgique n'intedira pas le transit de troupes américaines (Verhofstadt)," *Agence France Press*, 18 March 2003 (translated by author). NOTE: Belgian Prime Minister Guy Verhofstadt later reversed the comments by his Defense Minister, eventually allowing the transit of U.S. equipment and personnel to the war.

[219] Paul Ames, "Fearful of Threat to NATO role, Belgium seeks to soothe U.S. Anger over War Crimes Law," *The Associated Press*, 13 June 2003.

since warmed, but apprehension toward the U.S. seemingly remains in certain Belgian political circles.[220] Thus, transatlantic political issues quite possibly play a large role in Belgium's decision to forgo the JSF at this time.

Another issue affecting Belgo-American relations in combat aviation cooperation involves recoupments from the F-16 program, specifically the MLU upgrade. As the upgrade was offered to different countries outside the EPAF four, those original members were set to recoup money for the sale, but this was inexplicably halted when the U.S. sold the MLU to Taiwan and changed the structure of the transaction to exempt any European recoupments. This of course caused some consternation within the Belgian government (and doubtless the other three as well) and may well have added to preexisting views on the divergence of U.S. and Belgian interests in the aforementioned categories. Though many factions, including the Belgian Air Force, considered it a political issue which did not affect the strong military cooperation with the U.S, Members of Parliament remained fully aware of the recoupment issue when deciding to join the SDD program.[221]

Another transatlantic political issue affecting governmental procurement decisions toward the JSF is that of operational sovereignty, or being able to fly, repair, and maintain the aircraft without U.S. support. This is an important issue in the JSF given the unprecedented level of sensitive technology found in the aircraft, and the unparalleled level of multinational industrial collaboration involved in the design and production of the jet. In reality, the highly classified stealth technology and source codes required to repair sensitive electronics (and American unwillingness to share them) mean that a nation will be somewhat dependent on the U.S. if it purchases the fighter. The UK has publicly demanded more technology transfer to guard its independence in the matter (discussed later), but the loss of operational sovereignty takes a different slant when viewed from the smaller nations. Being operationally bound to the maker of your fighters is a much starker reality if there is only one combat aircraft in the inventory, as is the case for Belgium, Denmark, the Netherlands, and Norway. While not a pressing issue for the

[220] See « Aux yeux des Europeéns, la politique étrangère américane destabilize le monde, » poll conducted by tns-sofres for CNN and Time, http://www.tns-sofres.com/etudes/pol/291003_cnn_r.htm (accessed November 2006).

[221] Interview by email with Belgian Air Force F-16 Pilot and Staff Officer, 31 July 2006.

Netherlands given its high level of military to military support for U.S. equipment and tactics, operational sovereignty in Belgium is perhaps of larger consequence given its recent political distancing from America.[222] Evidence indicates that such other factors as aircraft capability will outweigh any loss of independence in the event of JSF sales to Denmark and Norway.[223] [224]

NATO currently wields little influence over the four EPAF countries in the procurement of fighter aircraft. According to a participant in NATO capability dialogues since 2004, the NATO Air Force Armaments Groups, specifically Aerospace Capability Group 1 does discuss "aircraft issues," but the issue of specific fighter capabilities is not on the table. And the subject of a common purchase of fighter aircraft is a subject never breached in this context.[225] Pressure from the EU to purchase a non-American aircraft had even less relevance to members' decisions, according to representatives in the JSF international office. The European Defense Agency and its push for a European Defense Equipment Market has no bearing on governmental decisions to purchase the JSF, at least in the sense of pressure to buy European.[226] Speculation remains that it may even force smaller countries such as the EPAF members more toward U.S. equipment.

Belgium finds itself in a unique position regarding these issues. Agreements with the Netherlands state it will operate the same equipment, yet the Dutch have more or less chosen the JSF as their next fighter without consultation with Belgium or other European partners. In a report presented to the Chamber of Representatives of the Belgian Parliament, the views of the Minister of Defense are expressed as disdainful

[222] Col. Madeleine Spit, Royal Netherlands Air Force National Deputy, Joint Strike Fighter Program Office, personal interview by author, JSF Program office, Washington D.C., 3 October 2006.

[223] Col. Arnt Arnsten, Royal Norwegian Air Force National Deputy, Joint Strike Fighter Program Office, personal interview by author, JSF Program Office, Washington D.C., 4 October 2006, and Col. E.T. Pedersen, Royal Danish Air Force, interview 2 and 3 October.

[224] NOTE: An opposing view to the fear of relinquishing operational sovereignty would hold that smaller countries are equally apprehensive about losing favor with the United States by not purchasing its equipment. Both issues surely influence decision-makers in NATO's smaller members, with the "older" alliance members more likely to stray from under the American umbrella.

[225] Lt. Col. Harry VanPee, Belgian Air Force Representative to NATO Air Forces Armament Group, personal interview by author, 19 June 2006, Brussels, Belgium.

[226] Lt. Col. VanPee interview, Col. Arnst interview, and Col. Pedersen interview.

toward the Netherlands for putting them in the awkward position of being forced to choose the JSF in order to honor its commitments to its Benelux neighbor.[227] The report blames European defense integration for exacerbating the difference between "Europeanist" nations such as Belgium and "Atlanticist" nations such as the Netherlands.[228] Belgium public opinions are consistently more positive than most EU member states in its trust for EU institutions and its support for a common foreign and security policy as well.[229]

b. Domestic Politics

Domestic political issues are perhaps the most influential to this study, yet those least able to offer true insight due to the nature of "closed-door" meetings between politicians and interest groups. The normal variety of political, social and economic groups shape domestic politics in continental Europe as is the case in the U.S. or the UK. This process shall naturally play a formidable role in the decision of respective governments to acquire the JSF. Anti-war interest groups, anti-U.S. interests and budget issues as are visible elsewhere but shall undoubtedly make their voices heard in such a decision. Nonetheless, publicly known developments in potential JSF customer nations serve to illustrate the domestic issues exerting influence on this important national decision. The most influential factors are logically budget issues and views on the importance of defense to reigning politicians.

Greece, by way of example, originally signed a contract with EADS to purchase 60 Eurofighters but budget constraints stemming from cost overruns at the 2004 Olympic Games forced a cancellation of this order and a redirection toward the smaller and cheaper order of 30 F-16 Block 52's. An additional fighter purchase was planned for 2009-2010, which included the JSF as a possibility, but this has now been moved to the right due to another modification of defense budget priorities. However, Turkey's likely

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[227] Rafale Mathieu, Commission de la Défense nationale, Compte rendu intégral des débats, CRABV 50COM 663, 19 February 2002, 91 (Report to Chamber of Representatives, Belgian Parliament, translated by author and Claire Duchateau-Reinhard).

[228] Ibid., 105.

[229] *Eurobarometer 63: Public Opinion in the European Union* (Brussels: European Commission, July 2005), 13, 31.

purchase of the JSF for delivery in 2015 as well as Greece's cooperation with the U.S. in three separate orders of F-16's will certainly have sway toward the JSF when money is found in the budget.[230]

Denmark's venture to replace its F-16's has largely avoided political wrangling and threats of cancellation in the Parliament. Recently, however, the Social Democrats proposed replacing the country's aging fighters with attack helicopters, a proposal described as "interesting" by the Minister of Defense, yet seemingly unrealistic.[231] The decision to replace fighters has never been seriously questioned, though logically some debate has taken place in Parliament over the choice of replacements.

Domestic politics will likely play a much larger role when Norway decides on the replacement for its F-16's. National elections in September of 2005 brought two political parties into power that denigrated the JSF while in opposition, and perhaps the two most important posts for defense procurement went to these parties. Anne-Grete Strom-Erichsen, Norway's Minister of Defense, belongs to the leftist Labour Party, which holds 32.7% of the seats in Parliament, while the Ministry of Finance is held by Kristin Halvorsen of the Socialist Left Party of Norway, currently holding 9% of the seats. The latter party is openly critical of large defense contracts and Norway's participation in NATO or coalition operations with the United States, a fact that does not bode well for the future of the JSF in Norway.[232]

Despite strong support from both military and industry, domestic politics nearly derailed the JSF program in the Netherlands in 2006. When the Dutch government resigned in June, an interim cabinet took over until a national election on the 22nd of November, with the agreement that no major decisions would be undertaken until the

[230] "F-16 Shoots Down Greece's $6B Eurofighter Typhoon Order," *Defense Industry Daily*, 20 July 2005, http://www.defenseindustrydaily.com/wp-output/industry/contracts-awards/f16-shoots-down-greeces-6b-eurofighter-typhoon-order-0886/ (accessed November 2006).

[231] "Fighter Jets Face Copter Swap," *The Copenhagen Post*, 16 November 2006, http://www.cphpost.dk/get/99081.html (accessed November 2006).

[232] Endre Lunde, "Norway's Future Fighter Competition: A Norwegian View," *Defense Industry Daily*, 11 May 2006, http://www.defenseindustrydaily.com/wp-output/innovation/new-systems-tech/norways-future-fighter-competition-a-norwegian-view-02246/ (accessed November 2006). See also *The World Factbook*, United States Central Intelligence Agency Website, https://www.cia.gov/cia/publications/factbook/geos/no.html#Govt (accessed November 2006).

next administration was in place. However, given the Labour Party's promise that no JSF's would be purchased if they took power, the interim Christian-Democrat and Conservative government took action to sign the MOU committing the Netherlands to the PSFD phase on 14 November 2006. This sensitive political action involved moving up the scheduled December signing of the MOU in the JSF Program Office to ensure continued Dutch support for the program, which once again appears to be on track.[233] This example illustrates the powerful influence of domestic politics on such decisions and clever workarounds by other interested parties.

The impact of domestic politics on Belgium's decision to refrain from the SDD phase of the JSF program is difficult to measure given the immense complexity of this matter. Two of Belgium's three regions, Flanders and Wallonia, house separate governments with differing sets of political parties, and relations between the two regions are traditionally tense, which greatly complicates decisions at the national level.[234] However, it is safe to say that defense-related issues do not occupy a large portion of the public consciousness in this small nation, even more so than in others. Leftist parties currently hold 98 out of 150 seats in Parliament, with social programs generally commanding higher priorities than defense in their platforms.[235] In addition, political personality takes on a large role in Belgium which seemingly has affected the JSF decision a great deal. The Ministry of Defense has been occupied by André Flahaut of the Parti Socialiste since 12 July 1999, whose Gaullist outlook presented itself during the U.S. Invasion of Iraq in 2003 (see page 82). Flahaut can be said to be no friend of combat

[233] Col. Madeleine Spit interview. See also Joris Janssen Lok, "Dutch Defense Industry Braces for Outcome of Elections," *Jane's International Defense Review*, 1 November 2006 for an excellent overview of this issue. In addition, see "Netherlands agrees to continue JSF project," F-16.net Website, http://www.f-16.net/news_article1996.html, 30 September 2006 (accessed November 2006) and "Dutch Government Sticking to JSF as successor to F-16," *ANP News Agency*, 13 May 2006 (translated by Defense-aerospace.com) http://www.defense-aerospace.com/cgi-in/client/modele.pl?prod=68891andsession=dae.20752133.1147804379.RGoa28Oa9dUAAG4HgGwandmodele=release (accessed November 2006). NOTE: The Christian Democrat Party retained a slight majority in the elections on 22 November, likely cementing the future of the JSF in the Netherlands.

[234] NOTE: In fact, politics are much more complicated, as Brussels itself is a separate region, there are three different official languages in Belgium and several levels of government based on regions and linguistic communities. leaving in essence six different legislative bodies that interact to rule the country. See CIA Factbook, https://www.cia.gov/cia/publications/factbook/geos/be.html#Govt (accessed November 2006).

[235] U.S. Department of State Website, http://www.state.gov/r/pa/ei/bgn/2874.htm (accessed November 2006).

aviation in Belgium and the lack of a decision to date as to the replacement of F-16's in 2015 is likely linked to both the pro-Gaullist European and anti-fighter aircraft views of the Defense Minister.[236]

2. Issues with JSF Industrial Participation

The Joint Strike Fighter Industrial Participation Program, as previously discussed, is unprecedented in its scale and international character. Designed to ensure more involvement for business than competing aircraft programs in the hopes of securing aircraft orders, it targeted the "third pillar," or national defense industries as customers in lieu of simply foreign militaries. The departure from traditional offset programs would also in a sense allow industries to determine their own profit from the program, as greater efficiency would lead to a better overall product at a cheaper price, thus leading to additional export orders outside of the original partners and corresponding recoupments for nations and their industry. Industrial participation clearly plays an enormous role in convincing governments to purchase fighters, as evidenced in recent campaigns by both Eurofighter and Saab teams to match potential JSF industrial shares. However, this aspect of the JSF program is not without criticism from partner nations and industries. A large study conducted by the U.S. Department of Defense examined this issue in depth in 2003, and the following section seeks to expand on its findings.[237] Analyzing grievances of partner nations as well as industrial motivations of non-participating countries greatly aids in the search for JSF procurement decision rationale.

a. The Netherlands

The Netherlands' participation in JSF appears equally hinged on military requirements and industrial involvement, and clearly a major pillar of the Dutch JSF "sales campaign" to decision-makers in Parliament involves the health of the national

[236] Anonymous interviews with several members of the Belgian Armed Forces and aerospace defense industry. NOTE: By way of anecdotal evidence, during a Belgian Armed Forces day in 2003 intended to present possible military careers to local high school students, the only military representative not asked to directly address the students was the F-16 pilot representing Belgian combat aviation. (As recounted to author by said pilot.)

[237] *JSF International Industrial Participation: A Study of Country Approaches and Financial Impacts on Foreign Suppliers* (Washington D.C.: Department of Defense, June 2003).

aerospace industry. Following the collapse of long-time aerospace giant Fokker in the mid-1990's, the Dutch government sought to soothe this blow to national pride by reinvestment in several key aerospace areas. The JSF was chosen as the aircraft to save the military aerospace sector (with the Airbus 380 winning the job for the civilian side) and Dutch entry into the SDD phase of the JSF program thus occurred chiefly for reasons of industrial necessity.[238] In fact, the $800 million invested by the Dutch into the SDD phase came from industry as well as government sources, establishing a new form of cooperation between the two and demonstrating the industrial importance of the program, according to then-Minister of Defense Henk van Hoof.[239] As of August 2006, over 70 companies in the Netherlands had received contracts totaling over $700 million, with opportunities still present for more industrial share.[240] The Dutch State Secretary for Defense Procurement Cees van der Knaap recently mentioned a possible $10.8 billion in JSF-related business for the Netherlands, though one of Parliament's concerns over Dutch involvement in the program is whether this return on investment will be realized.[241] A further concern is the geographic, export control, and technology sharing limitations which prevent a "level-playing field" for Dutch companies hoping to win contracts.[242] Many smaller firms vying for subcontracts feel unable to compete with U.S. firms more familiar with litigation involving technology export, or larger firms able to hire the required lawyers to understand such a complicated process.[243] The Netherlands certainly understands the importance of JSF industrial participation to their national industry and thus the weight it will carry when the decision is made whether to purchase the aircraft. While issues exist as to the construct of the program, they do not appear significant enough to cause the Netherlands to terminate its JSF venture.

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[238] *JSF International Industrial Participation: A Study of Country Approaches and Financial Impacts on Foreign Suppliers* (Washington D.C.: Department of Defense, June 2003), 36-37.

[239] Elizabeth Book, "Joint Strike Fighter Partners Hope for Industrial Windfall," *National Defense*, http://www.nationaldefensemagazine.org/issues/2003/Jan/Joint_Strike.htm, January 2003 (accessed October 2006).

[240] "More than 70 Dutch companies already involved in development of F-35 Lightning II," Stork Aerospace Press Release, 8 September 2006.

[241] Joris Janssen Lok, "Dutch Defense Industry Braces for Outcome of Elections," *Jane's International Defense Review*, 1 November 2006. This article offers an excellent overview of Dutch industry interest and involvement in the JSF program.

[242] *JSF International Industrial Participation*, 36.

[243] Col. Madeleine Spit Interview, 3 October 2006.

b. Denmark

The Danish approach to industrial participation is somewhat different, seeing it instead as an enabler to achieving the overarching goal of purchasing the Joint Strike Fighter for its defense forces. This does not diminish the importance of the Danish aerospace industry to the program, however, as it remains the chief selling point to Parliament and thus the focus of the Danish effort during the SDD phase of the program. It is telling that the Danish national deputy in the JSF program office has a strong background in defense acquisition and an excellent working relationship with industry, though he represents the Royal Danish Air Force.[244] Denmark contributed $125 million to the SDD phase (partnering with Norway to meet the minimum requirement as a team), a substantial amount of its defense budget. Industry was persuaded to contribute $20 million of this, with the positive experience of F-16 offsets and the anticipated benefits of JSF industrial participation playing a large role in the decision.[245] The Danish JSF national deputy now plays an active role in ensuring industry is satisfied with the direction of their investments.[246] Concerns over this aspect of the program are similar to those of the Netherlands, with issues arising as to the viability of small foreign firms winning contracts despite complicated U.S. export restrictions. Also, larger firms have the opportunity to absorb costs upfront that can later be recouped in the production phase, again presenting obstacles to smaller firms and thus smaller nations such as Denmark.[247] Like the Netherlands, Denmark places significant importance on industrial participation in convincing those who will decide to purchase the JSF and any grievances with the aspect of the JSF program are overshadowed by the positive experience thus far.[248]

c. Norway

Norway's view of the JSF industrial participation program is somewhat different from Demark's and the Netherlands and plays a large role in making this nation

[244] Col. Pedersen Interview, 2 and 3 October 2006.

[245] NOTE: It was pointed out that industrial recoupments over a 30-40 year lifespan of the aircraft would stand to be quite substantial.

[246] Ibid.

[247] Col. Pedersen Interview and *JSF International Industrial Participation*, 61.

[248] Col. Pedersen Interview.

the most likely to purchase other aircraft when the decision is made. The 2003 U.S. Department of Defense Report "JSF International Industrial Participation" identified several major obstacles in Norway's approach to the program that hindered its ability to secure contract work. The Norwegian government, for example, has admitted that despite forming government/industry working groups, it did not set up a structure or offer the support necessary to industry to maximize its chances of success. Officials in the Norwegian Ministry of Defense have remarked that they admired the Netherlands and Canada for taking a more strategic approach to JSF industrial participation for their aerospace industries.[249] The Norwegian Government, which contributed all of the $125 million to the JSF SDD phase, considered this to be enough help to its aerospace industry, but this thinking was based more on an offset program, which in fact the JSF is not.[250]

The JSF practice of awarding contracts on "best value" instead of offsets such as in the F-16 program was initially little understood in Norway and has led to several threats of pullout from the SDD phase.[251] High ranking officials in influential positions have repeatedly demonstrated either a lack of willingness to compete for contracts, or a lack of understanding in this aspect of the program. In February 2006, the acting president of Norway's 850,000 member confederation of trade unions remarked "No offsets, no plane…the offset success of the F-16 program must be repeated without question…Lockheed Martin should have known that this is how we do business here."[252] While such motives for rejecting a program based on more efficient production from workers may be somewhat excusable considering the source, Norwegian industry at times has seemingly rejected "best value" out of sheer misunderstanding. For example, Norway's largest defense firm, Kongsberg Defense and Aerospace (or KDA), was contacted by Lockheed Martin to bid on parts of the JSF Carrier Version's arresting gear, but declined to bid for reasons that it considered itself more capable of contributing to the

[249] *JSF International Participation*, 57.

[250] Col. Arnt Arnsten interview, 4 October 2006.

[251] For example, Norway nearly left the program in May of 2006 before Lockheed Martin found a substantial amount of 'best value' contracts that Norway would win if it desired. See Graham Warwick, "Norway to Stay in JSF for Now," *Flight International*, 16 May 2006.

[252] Joris Janssen Lok, "Norwegian Unions Press for JSF Offsets," *Jane's Defense Weekly*, 8 March 2006.

higher technology aspects of the project such as software design and weapons interface. This prompted Norway's Assistant Director General at the Ministry of Defense, Christian Tybring-Gjedde, to remark:

> 'Best value' is not 'best value'…it's targeted…Lockheed Martin tells Kongsberg 'you will compete for this and that'…We feel that Lockheed Martin predeciding who gets RFPs (requests for proposal) is not a 'best value' approach.[253]

KDA's relationship with Lockheed Martin has been strained due to such differing views of the JSF program approach, where ironically the American firm's intentions have been to help KDA secure contracts.[254]

Relations have warmed in the latter half of 2006, but a lack of familiarity in dealing with American companies and the resultant lack of communications between KDA and Lockheed renders Norway unsure if it already missed valuable opportunities and whether it can compete for remaining contracts. It has teamed with Canada and Denmark to bid for contracts together in order to take advantage of their experience with American business.[255] However, it may be a question of too little too late for KDA and Lockheed. KDA has reportedly experienced quite positive results working with the Eurofighter program in terms of open communication in helping it win contracts.[256] And with the Eurofighter and Gripen programs offering substantial offset packages in the event of sales, Norway's previously negative experience with the JSF program may prove too much to overcome.[257]

d. Belgium

As the only non-participating member of EPAF in the Joint Strike Fighter program to this point, Belgium and the role of its industry in abstaining is significant. When Belgium considered joining the SDD phase in 1999, the government consulted

[253] *JSF International Industrial Participation*, 58.

[254] Ibid., 57.

[255] Col Arnt Arnsten Interview, 4 October 2006, and *JSF International Industrial Participation*, 57.

[256] *JSF International Industrial Participation*, F-4.

[257] NOTE: A major interest of Norwegian industry involves the inclusion of the Naval Strike Missile, produced by KDA, in the airframe design. Lockheed Martin has been keen to include this in design proposals in order to keep Norway as a partner in the project.

industry officials in order to determine the potential impact. Interest in Belgium's major aerospace firms was high in joining the venture, as previous experience with the F-16 program had yielded positive results and good working relationships.[258] Between May and December much lobbying took place on behalf of industry in the Belgian government. In October, three key firms (one from each of the country's regions) collaborated to offer the government $6 million to aid in joining the SDD phase. At this point, the government apparently decided not to decide, as no official reason was granted to industry representatives for Belgium's eventual abstention from the program. Coincidentally, André Flahaut became Minister of Defense in July of 1999 (see page 86). Key industry officials have indicated their continued desire for contracts, but have received vague responses from government officials regarding Belgium's chances of involvement with the JSF.

Thus, Belgian defense firms seem to have been usurped by politicians' interests in this case, and remain discontented for having missed a large opportunity to advance their industry. In fact, in mid-2006 a Dutch firm sought bids for involvement in the privatized maintenance of their F-16's. The Belgian firm Techspace-Aero was informed their business case was the best but would not be considered due to their lack of involvement in the Joint Strike Fighter program.[259] The exclusion from the JSF program is felt by Belgian aerospace industry still in 2006, and indicates a shift toward a "JSF" and "non-JSF" separation in European defense industries.

e. Other JSF International Program Concerns

One issue certainly worrisome to the JSF team is the recent offset deals offered by both Gripen and Eurofighter to potential European JSF customers. The Danish firm Terma signed a Memorandum of Understanding recently with the Eurofighter consortium to pursue industrial work together in the event of a buy, though no figures were discussed. Saab has offered Denmark 48 Gripen fighters at a cost of $1.82 billion, including 100 percent offsets, which certainly will look tempting to the Danes from a

[258] NOTE: The aforementioned matter with recoupments was viewed as a political issue and appears to have had no major effect on defense firms themselves.

[259] Jean-Paul Eggen, Techspace-Aero, Liège Belgium. Telephone interview by author, 30 October 2006.

financial standpoint.[260] Surely sensing the blood in the water over Norway's lack of confidence in the JSF industrial participation program, Eurofighter recently offered Norway $6.3 billion of guaranteed offset work in the event of a purchase, and Saab proposed 48 Gripens at $3.1 billion with 100 percent offsets as well, a price lower than previous offers.[261] The Joint Strike Fighter's innovative industrial participation program could end up working to its disadvantage in the case of Norway by inciting competition that it is unable to match.

An important matter relating to industrial participation is that of limited technology sharing between the U.S. and its allies. While this issue has been made most public by the UK (the only Tier 1 partner) and its demands for operational sovereignty (see page 83), the Tier 2 and Tier 3 partners also see it as an impediment to their industries securing contracts. Often, the problems lie not with U.S. industry or even the Department of Defense, but rather existing export control laws, making the State Department and massive U.S. bureaucracy appear as the villain. Denmark, the Netherlands, and Norway have all expressed concern that such laws especially limit the ability of smaller firms to secure JSF contracts. Recently, steps have been taken to alleviate the problem, with Lockheed Martin and President Bush both assuring the UK this year that a technology transfer solution will be found to allow them to achieve their operational sovereignty goals.[262] Also, the DOD continues to work to assuage concerns, as evidenced in the February 2006 Quadrennial Defense Review:

> Whenever possible, the U.S. works with and through others, enabling allied and partner capabilities, building their capacity and developing mechanisms to share the risks and responsibilities of today's

[260] Donna Richardson, "Saab teams with Aerotech for Danish Gripen bid," *Jane's Defense Weekly*, 8 November 2006.

[261] See John Berg, "Eurofighter offers Norway work worth $6.3bn," *Jane's Defense Weekly*, 18 October 2006, and John Berg, "Saab offers Gripens to Norway," *Jane's Defense Weekly*, 1 December 2006. NOTE: The difference in prices between Saab's offers to Denmark and Norway illustrates the murky nature of defense figures in deals such as this, most likely understood only by those at the highest levels. The overarching idea remains that Eurofighter and Saab are competing quite aggressively with JSF to win sales in these two countries.

[262] Ben Vogel, "UK-US Move Forward on JSF Technology Transfer," *Jane's Defense Industry*, 1 September 2006.

> challenges…winning the long war requires…overhauling traditional foreign assistance and export control laws…*where necessary providing advanced military technology to foreign allies and partners*.[263]

However, much work is to be done in this realm to ensure smaller allies are not driven toward European programs due to easier access to technology. A 2003 GAO report found that Lockheed Martin and the JSF Program Office were aggressively working to find solutions to this problem so that smaller defense companies would not be forced out.[264] The process remains extremely cumbersome in the U.S. due to existing legislation,[265] but work in the JSF program office continues daily on this issue. (See page 53 for an overview of recent legislation in this matter.) The allies seem to understand that work is being done to alleviate the problem, but the limitations of the system certainly poses the danger of smaller industries giving up their efforts to access U.S. technology and thus taking their governments with them to a competing program such as Eurofighter or Gripen. It is difficult to tell how this variable weighs on decisions to continue in the JSF program, but the solution ultimately lies in the satisfaction of the partners with their nations' industrial participation.

In sum, the industrial participation aspect of the Joint Strike Fighter program is perhaps the most important facet for convincing governments to enter/continue the venture and eventually purchase the aircraft. Experience in the F-16 program for the EPAF seems to hold influence over their views toward JSF industrial participation. Belgian industry desired entry into the SDD phase to advance its interests, keen to repeat successes in the MNFP program, but political concerns prevented it. The Danish military sees industrial participation foremost as an avenue to convince decision-makers to purchase the best aircraft, while at the same time profiting from a seemingly lucrative long-term venture, again building on positive experience with U.S. industry

[263] *Quadrennial Defense Review Report* (Washington D.C.: Office of the Secretary of Defense, 6 February 2006), 88, 91. (emphasis added by author).

[264] *Joint Strike Fighter Acquisition* GAO Report, 16-18.

[265] Interviews with JSF Program Office national deputies. See also Adams et al., *Bridging the Gap*, 158. NOTE: Obviously sharing technology is not desired by those in the U.S. wanting to keep industrial economic advantages or those concerned about proliferation and the negative effect on U.S. national security. *Bridging the Gap* affords this sensitive issue the debate it deserves, where this study unfortunately does not have the room. The multiple processes required to export U.S. technology are nicely explained as well. See also *Defense Trade: Arms Export Control System in the Post-9/11 Environment* (Washington D.C.: General Accounting Office, GAO-05-234, February 2005).

through the F-16 program. The Netherlands military sees JSF as a means to save its military aviation industry and like Denmark places great importance on government/industry cooperation to maximize the benefits the program offers. Norway, on the other hand, had less experience (though not necessarily unfavorable) in the F-16 venture, and misunderstandings and poor communications with Lockheed Martin in the JSF program have led to negative feelings so far as to the benefits it offers. Issues such as technology transfer limits with the U.S. and competing (and simpler) offers of industrial offsets from Eurofighter and Saab may in fact sway them to seek non-JSF options in the future.

3. Military Concerns

While the System Design and Development Phase offers nations the opportunity to bid for JSF contracts and secure future recoupments provided they continue in the program, it also allows access to the aircraft itself and some degree of influence in the design requirements. As a Tier 1 partner, the UK is essentially an equal at the negotiation table, with 10 staff positions including certain senior level ones on integrated product teams. Italy and the Netherlands are afforded a certain degree of design influence as the Tier 2 partners, while the Tier 3 benefits include one program office staff member and no official vote for requirements.[266] These differences in prescribed degrees of influence and corresponding ambiguities have caused concern among certain partner countries as to how much say they have in the design of the aircraft and exactly what their investment in the SDD phase is buying them. Negotiations in this area also indicate nations' perceptions of the aircraft's capabilities and the importance they place on its ability to defeat anticipated threats.

Denmark and Norway, as Tier 3 partners, realize their influence to be limited concerning aircraft design requirements. But as previously discussed, Norway is aggressively lobbying Lockheed Martin to include an option for its Naval Strike Missile in the design. This appears to be looked at more as an industrial issue for parties involved, as Norway normally should not dictate aircraft specifications; yet as a partner seriously considering other options it is afforded a certain margin of flexibility. The

[266] *Joint Strike Fighter Acquisition* GAO Report, 11.

Danish Air Force has indicated that it considers the JSF a superior aircraft to its competitors though it maintains no aspirations of influencing the capabilities of the final product as a Tier 3 partner. In fact, the Danish indications are that it trusted the aircraft to be a superior product but placed equal or more importance on the jet's ability to make Denmark interoperable with the U.S. as a coalition partner.[267]

With $800 million invested as a Tier 2 partner, the Netherlands commands a considerably more vocal role in the JSF program. Aircraft capability is of utmost importance to the Dutch, as they have invested a considerable amount in comparative aircraft and threat perception studies, concluding that the JSF with its stealth capability and highly advanced technology is the only solution for their future fighter needs.[268] Therefore, a say in aircraft capabilities is a must and is indicated not only by plans to purchase aircraft in the initial phases of production to perform test and evaluation with the U.S., but also by the engineering (as opposed to acquisition) background of the Dutch national deputy in the program office. For them, merely having a "foot in the door" to listen to U.S. and UK decisions is not enough, but ambiguities in the design of different tiers has caused some consternation on the Dutch side. Representatives have indicated there are too many "closed door meetings" and too much U.S. domination of the design specifications, in certain instances with little regard to their more sizable investment and Tier 2 status in the program. However, it was acknowledged that such issues were being addressed and did not threaten further Dutch participation in the program.[269]

The Belgian Air Force, as one could guess, maintains differing views on the JSF from certain domestic political factions. Consensus holds that the aircraft will be far superior to its current competitors and necessary to eventually maintain the viability of Belgium's combat air arm. Unlike its three EPAF partners, Belgium plans to fly its F-16's longer, at least until 2020 and perhaps 2025, which means a decision on the replacement may not happen until 2015. For this reason, the nation has signed on for more upgrades to its F-16's than its partners and intends to keep its current fleet of

[267] Interviews with Danish and Norwegian JSF representatives, 2-4 October 2006.

[268] Joris Janssen Lok, "JSF is best option for future threats, argues RNLAF," *Jane's Defense Weekly*, 15 November 2006.

[269] Col Madeleine Spit interview, 3 October 2006.

fighters as capable as possible as long as the existing industrial base continues to support the aircraft. As U.S. F-16's are phased out in favor of the JSF and EPAF nations begin to transition to the JSF, the Belgian Air Force will likely push for an FMS buy of the JSF. The decision to forego the initial phases of the program does not reflect any military disregard for the aircraft or the program.[270]

U.S. domination of the program is of course an issue felt by all the partner countries at differing levels. The most public incident causing enormous consternation to a partner country involved the U.S. Department of Defense's proposal to cancel the F-136 engine, a Rolls-Royce product intended to provide an alternate engine as well as huge manufacturing opportunities for the project's most important partner. Following pleas directly from Prime Minister Tony Blair to U.S. President George W. Bush, the engine program was reinstated but not before trust between the two partners had suffered a serious blow. Logically, smaller nations viewed this as a lack of concern for the international aspect of the JSF program, and feared further loss of influence if such actions continued. In the end, a decision taken by the DOD solely for the purpose of making budget restrictions was reversed due to the influence of much more important political factors. Nevertheless, this incident contributed to other allies' concerns about the true nature of such a "cooperative" program.[271]

The importance of aircraft capabilities and allied influence over them, in sum, illustrates priorities of partner on both sides of the Atlantic. Issues such as involvement in design requirements have mixed with other concerns such as what exactly an investment in the program entails in regard to a say in the program, as well as who's voice is truly heard at the negotiation table. The unprecedented design of the international participation aspect of the program thus has seen some growing pains over its initial

[270] Interviews with several Belgian Air Force staff officers and pilots, by email, telephone, and in person. Also, Mr. Ric Vranek of the Power Projection Division, Fighter Branch, office of the Secretary of the Air Force for International Affairs provided data on the F-16 MNFP program and forecast upgrades, personal interview, 4 October 2006, Washington D.C.

[271] See Christopher Bolkcom, *Proposed Termination of the Joint Strike Fighter (JSF) F136 Alternate Engine* (Washington D.C.: Congressional Research Service, #RL33390) and *Tactical Aircraft: DOD's Cancellation of the Joint Strike Fighter Alternate Engine Program Was Not Based on a Comprehensive Analysis*, (Washington D.C.: General Accounting Office, GAO-06-717R).

years, with lessons drawn on both sides, but evidence suggests that the U.S. side is willing to accommodate as required in order to keep partners satisfied, or at least enough to continue participation in the program.

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V. CONCLUSION

This thesis attempted to elucidate the current status of the so-called capabilities gap and the value Europe places on coalition warfare with the U.S. through a selective case study of nations expected to purchase the Joint Strike Fighter aircraft. By examining the rationale involved in national decisions to enter the U.S.-led JSF program, it sought the degree of seriousness Europe places on increasing its military capabilities and the significance it places on defense cooperation with the U.S. in the future. In order to answer such broad questions, we must first analyze the conclusions derived from the examination of procurement decisions regarding the Joint Strike Fighter.

A. RATIONALE FOR NATIONAL STANCES TOWARD JOINT STRIKE FIGHTER

This study found that militaries in Belgium, Denmark, the Netherlands, and Norway by and large favored the JSF as the replacement to their F-16 fighters for reasons of capability, interoperability, and continuing a strong military-to-military relationship with the United States. Military views generally held that technology and capabilities found in this aircraft would allow the air forces to meet current and anticipated threats in the air and on the ground for the foreseeable future, more so than its competitors. Great value was placed on experience in the F-16 cooperative program from the perspective of shared equipment, logistics, maintenance, tactics, and operational mindset. The increased weight and importance of these factors and general technological interdependence as will be found in the JSF is not lost on its potential operators, but most share the view that those making procurement decisions do not fully appreciate the importance of such factors in the 21st century.

Industrial factions generally found the JSF and its corresponding opportunities for national defense firms to be advantageous over its competitors. Gaining access to U.S. technology was a factor in addition to the opportunity to have a foot in the door of the largest ever transatlantic defense project. At times the benefits of industrial participation were not fully understood by participating nations and their defense industries which may be partly blamed on poor communication from the U.S. side. A lack of experience in

dealing with American industry, an initial unwillingness to subscribe to the JSF program's "best value" structure, and restrictive U.S. export control laws may lead to a country leaving the program. In general, broader industrial experience in the F-16 program led to increased likelihood of active industry involvement in the JSF project. Industries in those nations with favorable F-16 experience were also able to better lobby politicians to enter the JSF program. And those nations more concerned with building up aerospace industries saw better cooperation between government and industry. Lastly, evidence indicates that the aerospace defense industry in Europe is already being divided into "JSF" and "non-JSF" poles, causing certain concern in defense firms.

Politicians ultimately decide which weapons to procure, and this is no different with the JSF. This study found that Parliaments and Ministries of Defense and Finance played the most powerful roles in European decisions to enter the Joint Strike Fighter program, and these organizations took inputs from industry more than from militaries when making their choices. Generally, the nations with leftist governments solicited less input from military advisors while justifying the decisions to their publics. Those with members of leftist parties in key positions such as the Minister of Defense seemed less interested in joining the program. Also, politicians in the country with the most favorable attitude toward the European Union (Belgium) seem the least likely to purchase the JSF.

Thus, when the military, economic, and political factors which affect decisions of these four "expected" JSF customers are merged, it is not surprising that political issues win out. Those most likely to purchase the aircraft (Denmark and the Netherlands) have strong connections between government, industry, military, and the United States. Denmark's military realizes that industrial benefits will sell the jet to politicians, and Dutch military representatives sell it through their increased involvement in the design of the aircraft as a Tier 2 customer. But these relationships are ultimately enabled by the politicians themselves. Norway and Belgium, the least Atlanticist and more leftist of the four countries, are hindered by a lack of support between government and industry, or in Belgium's case no support by government to military or industry. This thesis holds that this is by design, as politicians' agendas in such countries do not seem to include interest in the JSF project.

This study reached several other key conclusions regarding Belgium, Denmark, the Netherlands and Norway. First, the EU or the EDA as institutions will probably bear no influence on the decision of these nations to choose between the JSF and a European aircraft, though countries may purchase a European jet for differing reasons. Next, capabilities are important to these nations, and they will replace their fighters with an aircraft they consider capable of performing the anticipated mission; but capabilities may not be the first priority when choosing a replacement (e.g. when compared to budgetary constraints). Lastly, while the F-16 program offered great benefits to military and industry (greater in some countries than others) its influence likely will take a backseat to other issues when politicians decide whether to procure the JSF. Europeans still care about maintaining capabilities in the air and continuing positive defense cooperation with the United States. Thus, the *reasons* these nations may not choose the JSF should not alarm U.S. policymakers, however further review hints that the *fact* they may abstain from the program could threaten relations in the future.

B. CLOSING THE GAP AND THE VALUE OF COALITION WARFARE WITH THE U.S.

As it stands in 2006, the capabilities gap as concerns aerial warfare is not worsening. With the Eurofighter and Rafale now joining the Gripen in operational squadrons around NATO, European air forces are more capable than ever in regards to precision-guided strike, all-weather abilities, and air-to-air capabilities against enemies close-in and beyond visual range. The MIDS data-link system even allows them to pass information between themselves and other NATO assets, including American aircraft. For now, European aircraft have more or less caught up to American capabilities. However, when the JSF adds its abilities of stealth and electronic warfare (and likely other key areas which remain classified) to air forces beginning around 2013, the capabilities gap will once again widen, likely much further than before, and nations settling on their next fighter choice in 2006 must take this into account. A choice against the JSF now is a choice against capabilities in the future. And worse, the JSF's principal

strength lies in its ability to gather and disseminate virtually all information on the battlefield, making interoperability with this platform more important than simply matching capabilities.

For now, Europe understands the importance of interoperability, and in 2006 it seems that communication and data-sharing is at an all-time high on the battlefield with improvements continuing. However, this thesis determined that even now, a gap is opening between those with full access to American intelligence and information, and those without. The rewards of "holistic interoperability" offered by the JSF are immense, not only in the full range of communications, but in infrastructure support such as mission planning materials, and not least in the operational culture fostered by training with and operating the same platform long before arriving at the modern battlefield. A choice against this platform is a choice against interoperability with the Alliance's most influential military. The "interoperability gap" between non-JSF and JSF nations and the dangers of being on the wrong side in the future seem to be understood by European militaries but the implications are lost on some politicians making the procurement decisions. Thus, perhaps unknown to those who need it most, the choice to forego the JSF will diminish a nation's value as a coalition warfare partner to the U.S. in the future.

C. CONCLUSION

The rationale of countries toward the JSF program who are expected to buy the aircraft does not necessarily indicate unwillingness to increase military capabilities or disdain toward the U.S. as a coalition partner. As always, the politicians who make procurement decisions may never reveal the true reasons for such decisions. This study determined that in the case of the JSF those politicians who decide to abstain will do so out of either misunderstanding the benefits the aircraft offers in capabilities and interoperability, or the relative weight they place on those benefits versus domestic political issues, especially those with a more European-centric attitude. This does not imply anti-Americanism per se, but making the JSF decision based on this factor will in all probability prove to be detrimental, as the long-term strategic implications of not choosing the latest American aircraft are likely understood by few.

The United States will continue its unwavering advances in high-technology military hardware, but at the same time does not desire to leave its potential coalition partners behind. The JSF program offers allies the opportunity to get on board the technology train, but unfortunately those who do not will most likely be left behind. U.S. grand strategy does not advocate driving others away through superior technology; rather it desires capable coalition partners. However, the high level of R and D spending in America and the resultant U.S.-owned technology leaves few choices to American allies except buying American equipment or being a second-tier participant in future coalition conflicts. In this sense, the JSF will serve to polarize Europe and the NATO allies, into the JSF camp and the others, perhaps furthering the divide between the Atlanticist nations and the Gaullists.

What is perhaps more disappointing for the future of transatlantic defense relations is the fact that this study only examined those nations *expected* to purchase the Joint Strike Fighter. Even if those four nations in the end purchased the aircraft and operated it alongside the U.S. for 30-40 years, many nations in Europe simply will not do so. France and Sweden will continue to operate their indigenous aircraft for as long as their industries remain viable, Germany will likely use the Eurofighter for many years to come, and the JSF may never be affordable to many smaller nations. History and reality show that all NATO members most likely will never operate the same aircraft, thus leading to a permanent divide between those who opt for U.S. technology and its benefits and those who attempt to match it through European alternatives. At the time of writing, the JSF manager at Lockheed, Tom Burbage, has announced the possibility of six other European nations joining the JSF program, all either NATO members or "close allies" looking to replace American-made fighters.[272] This combined with the possibility of newer NATO members to the East purchasing the aircraft after defense budgets will allow it is certainly good news for Lockheed Martin and the U.S. government. And perhaps good news for NATO as a whole and its ability to operate cohesively in future

[272] Joris Janssen Lok, "F-35 Program attracts additional European countries," *Jane's Defense Industry*, 1 December 2006.

theaters of war. But from a European perspective, the JSF may spell doom for indigenous defense industries and autonomy on the battlefield. It seems that no matter how idealistic this transatlantic program appears, not all parties can win.

LIST OF REFERENCES

"24 July 2006 – Second German Air Force Wing Takes Eurofighter Typhoon – Seventh Eurofighter Unit in Operation." Eurofighter Press Release. http://www.eurofighter.com/News/Article/default.asp?NewsItemId=245 (accessed October 2006).

A Secure Europe in a Better World: European Security Strategy. Brussels: Council of the European Union, December 2003.

Adams, Gordon, Guy Ben-Ari, John Logsdon, and Ray Williamson. *Bridging the Gap: European C4ISR Capabilities and Transatlantic Interoperability.* Washington D.C.: National Defense University, 2004.

Allied Command Transformation website, http://www.act.nato.int/welcome/history.html (accessed November 2006). Ames, Paul. "Fearful of Threat to NATO role, Belgium seeks to soothe U.S. Anger over War Crimes Law." *The Associated Press*, 13 June 2003. "America's Image Slips, But Allies Share U.S. Concerns over Iran, Hamas." *Pew Global Attitudes Project,* 13 June 2006. http://www.pewglobal.org (accessed November 2006).

Appathurai, James. "Closing the Capabilities Gap." *NATO Review*, Autumn 2002.

Archick, Kristin. *The United States and Europe: Possible Options for U.S. Policy.* Washington D.C.: Congressional Research Service, Report #RL32577, 23 January 2006.

Arnsten, Arnt. Colonel, Royal Norwegian Air Force. National Deputy, Joint Strike Fighter Program Office. Personal interview by author, JSF Program Office, Washington D.C., 4 October 2006.

Ash, Timothy Garten. *Free World: America, Europe, and the surprising future of the West.* New York: Random House, 2004.

Asmus, Ronald D. *Opening NATO's Door: How the Alliance Remade itself for a New Era*. New York: Columbia University Press, 2002.

Bajusz, William D. "Advanced Technology and Public Policy: Multinational Weapons Acquisition." *Policy Sciences* 11 (1980): 276.

Ball, Desmond. *Politics and Force Levels.* Berkeley: University of Calif. Press, 1980.

"Beyond the North Atlantic." *National Journal,* 8 April 2006.

Bergerson, Frederic. *The Army Gets an Air Force.* Baltimore: Johns Hopkins University Press, 1980.

Bitzinger, Richard A. “The Globalization of the arms industry: The next proliferation challenge.” *International Security* 19, Vol. 2 (Fall 1994): 171.

Bolkom, Christopher. *F-35 Joint Strike Fighter Program: Background, Status, and Issues*.” Washington D.C.: Congressional Research Service, 2 June 2006. Report #RL30563.

_____. *Proposed Termination of Joint Strike Fighter (JSF) F136 Alternate Engine.* Washington D.C.: Congressional Research Service, April 13, 2006. Report #RL33390.

Book, Elizabeth. “Joint Strike Fighter Partners Hope for Industrial Windfall.” *National Defense*, http://www.nationaldefensemagazine.org/issues/2003/Jan/Joint_Strike.htm, January 2003 (accessed October 2006).

Brown, Michael. Flying Blind: the Politics of the U.S. Strategic Bomber Program. Ithaca and London: Cornell University Press, 1992.

Burwell, Frances G., David C. Gompert, Leslie S. Lebl, Jan M. Lodal, and Walter B. Slocombe. *Transatlantic Transformation: Building a NATO-EU Security Architecture.* Washington D.C.: The Atlantic Council, 2005.

Camm, Frank. *The F-16 Multinational Staged Improvement Program: A Case Study of Risk Assessment and Risk Management.* Santa Monica: Rand Corporation, 1993.

Chaillot Paper no. 87: EU Security and Defense Core Documents 2005. Paris: Institute for Strategic Studies, European Union, March 2006.

Clark, Wesley K. *Waging Modern War: Bosnia, Kosovo, and the Future of Conflict*. New York: Public Affairs, 2001.

Cohen, Eliot. “NATO Standardization: The Perils of Common Sense.” *Foreign Policy* 31 (Summer 1978): 79.

Comprehensive Political Guidance: Endorsed by NATO Heads of State and Government on 29 November 2006. NATO Online Library. http://www.nato.int/docu/basictxt/b061129e.htm (accessed December 2006).

Coonen, Stephen J. “The Widening Military Capabilities Gap between the United States and Europe: Does it Matter?” *U.S. Army War College Quarterly* 36 (Autumn 2006): 67- 84.

Correll, John T. “Fifty Years of European Fighter Trends.” *Air Force Magazine* 74, No. 2, February 1991. http://www.afa.org/magazine/1991/0291euro.asp (accessed October 2006.

Cox, Michael. “Beyond the West: Terrors in Tranatlantia.” *European Journal of International Relations* 12 (June 2005): 203-233.

Daalder, Ivo H. and James M. Lindsay. *America Unbound: The Bush Revolution in Foreign Policy.* Washington D.C.: Brookings Institution Press, 2003.

Dale, Reginald, and Robin Niblett, "2006 Will Provide Clues to Europe's Future." *Euro-Focus, Center for Strategic and International Studies* 12, no. 1 (April 2006): 7.

DEFENSE TRADE: Arms Export Control System in the Post-9/11 Environment. Washington D.C.: General Accounting Office, GAO-05-234, February, 2005.

Dempsey, Judy. "Polish air carrier faces delicate choice; Buy American or buy European? Either decision could bring unpleasant repercussions." *International Herald Tribune*, 29 October 2004, 3. http://www.iht.com/articles/2004/10/29/poland_ed3__3.php (accessed November 2006).

DOD Team Pushed F-16 Sale. *Aviation Week and Space Technology*, January 20, 1975.

Dorfer, Ingemar. *Arms Deal: The Selling of the F-16.* New York: Praeger Publishers, 1983.

Donne, Michael. "Why three into one will go: EUROPE'S NEW COMBAT AIRCRAFT." *Financial Times*, 3 August 1985, Section I, 6.

Eggen, Jean-Paul. Techspace-Aero, Liège Belgium. Telephone interview by author, 30 October 2006.

Eisenhammer, John. "No tears as the old Widowmaker makes its last flight." *The Independent*, May 23 1991.

Eurobarometer 63: Public Opinion in the European Union. Brussels: European Commission, July 2005.

European Aeronautics and Defense Space Company Website, Annual Report 2004, http://www.reports.eads.net/2004/ar_2004/en/index.php?top_nav_b3.phpand_n_b3_1_1_6.phpand_c_b3_1_1_6.phpand_s_b3_1_1_6.php (accessed October 2006).

Farquharson, John. "Governed or exploited? The British Acquisition of German Technology, 1945-1948." *Journal of Contemporary History* 32 (January 1997): 33-42.

"Fighter jets face copter swap." *The Copenhagen Post Online*, 16 November 2006. http://www.cphpost.dk/get/99081.html (accessed November 2006).

Flournoy, Michèle A., Julianne Smith, Guy Ben-Ari, Kathleen McInnis, and David Scruggs. *European Defense Integration: Bridging the Gap between Strategy and Capabilities*. Washington D.C.: Center for Strategic and International Studies, 2005.

From St. Malo to Nice: European defence: core documents. Paris: Institute for Strategic Studies, European Union, 2001.

Gallis, Paul. *Kosovo: Lessons Learned from Operation Allied Force.* Washington, D.C.: Congressional Research Service, 14 November 1999. Report #RL30374.

_____ *NATO in Afghanistan: A Test of the Transatlantic Alliance.* Washington D.C.: Congressional Research Service, 22 August 2006. Report #RL33627.

Goldstein, Avery. "Discounting the Free Ride: Alliances and Security in the Postwar World." *International Organization* 49 (Winter 1995): 39-71.

Gompert, David C., Richard L. Kugler, and Martin C. Libicki. *Mind the Gap: Promoting a Transatlantic Revolution in Military Affairs.* Washington D.C.: National Defense University Press, 1999.

Guay, Terrence R. "The Transatlantic Industrial Base: Restructuring Scenarios and their Implications." *Strategic Studies Institute, U.S. Army War College* (April 2005).

Harris, Richard. Chief, Office of Defense Cooperation, U.S. Embassy Oslo, Norway, interactive forum, *Dagbladet Online*. http://www.dagbladet.no/nyheter/2006/05/01/464964.html (accessed August 2006).

Hura, Myron, Gary McLeod, Eric V. Larson, James Schneider, Dan Gonzales, Daniel M. Norton, Jody Jacobs, Kevin M. O'Connell, William Little, Richard Mesic, and Lewis Jamison. *Interoperability: A Continuing Challenge to Coalition Air Operations.* Santa Monica: Rand Corporation, 2000.

Is DOD meeting Joint Strike Fighter (JSF) International Cooperative Program Goals? Hearing before the subcommittee on national security, emerging threats, and international relations, 108th Congress First Session. Washington D.C.: United States Government Printing Office (July 2003).

Jane's All the World's Aircraft. www.Jane's.com, (accessed November 2006).

Janssen, Joris. "JSF is best option for future threats, argues RNLAF." *Jane's Defense Weekly*, 15 November 2006.

_____. "F-35 Program attracts additional European countries." *Jane's Defense Industry*, 1 December 2006.

JSF International Participation: A Study of Country Approaches and Financial Impacts on Foreign Suppliers. Washington D.C.: Department of Defense, Office of the Deputy Undersecretary of Defense for Industrial Policy, June 2003.

Joint Strike Fighter Acquisition: Cooperative Program needs Greater Oversight to Ensure Goals are Met. Washington D.C.: United States General Accounting Office (July 2003) GAO-03-775.

Joint Strike Fighter Website, http://www.jsf.mil/f35/f35_technology.htm, (accessed November 2006).

Jones, Seth G., and F. Stephen Larrabee. "Arming Europe." *The National Interest* 82 (Winter 2005/2006): 62-68.

Kagan, Robert. *Of Paradise and Power: America and Europe in the New World Order*. New York: Random House, 2003.

Kahler, Miles. "Multilateralism with Small and Large Numbers." *International Organization* 46 (Summer 1992): 681-708.

Kapstein, Ethan B. "Allies and Armaments." *Survival* 44, Vol. 2 (Summer 2002): 141-155.

_____. "Capturing Fortress Europe: International Collaboration and the Joint Strike Fighter." *Survival* 46 (Autumn 2004): 137-160.

_____. "International Collaboration in Armaments Production: A Second Best Solution." *Political Science Quarterly* 106, No. 4 (1991-1992): 660.

Kosovo/Operation Allied Force After-Action Report: Report to Congress. Washington D.C.: Department of Defense, 2000.

Krauthammer, Charles. "Who Needs Allies: Now they are neutrals. America can stand tall without them." *Time International*, 26 January 2004. 40.

Lambeth, Benjamin S., *NATO's Air War for Kosovo: Strategic and Operational Assessment.* Santa Monica: Rand Corporation, 2001.

Larson, Eric, Gustav Lindstrom, Myron Hura, Ke Gardiner, Jim Keffer, and Bill Little. *The Interoperability of NATO Allied Air Forces: Supporting Case Studies.* Santa Monica: Rand Corporation, 2004.

Lemke Bernd et al., *Die Luftwaffe, 1950-1970.* Munich: Oldenbourg, 2006.

Lindberg, Tod. *Beyond Paradise and Power: Europe, America, and the future of a troubled partnership*. New York: Routledge, 2005.

Lindstrom, Gustav. *EU-US burdensharing: who does what?* Paris: Institute for Security Studies, Chaillot Paper 82, September 2005.

Little, Robert. "U.S. Dollars Wooed Ally in Iraq Coalition." *The Baltimore Sun*, 14 October 2004. http://www.informationclearinghouse.info/article7097.htm (accessed November 2006).

"Lockheed ordered to produce documents." *World News Digest*, 27 December 1975, 975, C3.

Longu, Sorin. “European Perceptions of U.S. High-Technology and Defense Strategies since the Final Days of the Cold War: A Sine Qua Non Research Agenda?” *Strategic Insights* Vol. 4, Issue 6 (June 2005).

Lorell, Mark A. and Hugh P. Leveau. *The Cutting Edge: A Half Century of Fighter R&D*. Santa Monica: Rand Corporation, 1998.

MacKenzie, Christina. “Rafale, the French Fighter, Scrambles for Export Orders.” *International Herald Tribune*, 17 July 2006.

Markusen, Ann. “The Rise of World Weapons.” *Foreign Policy* 114 (Spring 1999): 40-51.

Mathieu, Rafale. Commission de la Défense nationale, Compte rendu intégral des débats, CRABV 50COM 663, 19 February 2002, 91. (Report to Chamber of Representatives, Belgian Parliament, translated by author and Claire Duchateau-Reinhard).

Michel, Leo A. *NATO-EU-United States: Why not a virtuous ‘ménage à trois’?* Washington D.C.: Institute for National Strategic Studies, National Defense University, 2006.

Muradian, Vago. “Coffman: JSF Critical to Preserving U.S. Leadership in World Fighter Market.” *Defense Daily*, 26 February 2001.

Nativi, Andy and Douglas Barrie. “Europeans Earmark Billions for JSF.” *Aviation Week and Space Technology*, 220, 21 November 2006, 4.

NATO: The First Five Years, 1949-1954. Paris: North Atlantic Treaty Organization, 1954.

“NATO Divided.” *The Economist*, 12 February 2003. http://www.economist.com/agenda/displayStory.cfm?story_id=1576270 (accessed November 2006).

“NATO moves to acquire C-17 strategic aircraft.” *NATO website*, 12 September 2006. http://www.nato.int/shape/news/2006/09/060912a.htm (accessed November 2006).

“NATO PA’s Outgoing President Expresses Concern for NATO’s Future.” *NATO Press Communiqué*, 16 November 2006.

“NATO Reports on Fighter Comparisons.” *Aviation Week and Space Technology*, 7 April 1975, 41.

NATO Strategy Documents 1949-1969, ed. Gregory W. Pedlow. NATO Archives. http://www.nato.int/archives/strategy.htm (accessed November 2006).

Nicoll, Alexander. “National Differences Scupper Frigate Project.” *Financial Times*, 28 April 1999, 2.

Nishiyama, Takashi. “Cross-Disciplinary Technology Transfer in Trans-world War II Japan.” *Comparative Technology Transfer and Society* 1 (December 2003): 316.

North, Richard. “The Wrong Side of the Hill.” *DefenseIndustryDaily,* August 2005.

“Panavia Tornado: History and Development.” http://www.fighter-planes.com (accessed October 2006).

“Political, Technology Transfer Issues Cloud NATO Cooperation Strategies.” *Aviation Week and Space Technology* 29, No. 10.

“Q and A: What makes the Eurofighter fly?” *BBC News Website*, 18 August 2006. http://news.bbc.co.uk/2/hi/europe/1818077.stm (accessed August 2006).

Quadrennial Defense Review Report. Washington D.C.: Office of the Secretary of Defense, 6 February 2006.

Quinlan, Joseph. *Drifting Apart or Growing Together? The Primacy of Transatlantic Economy.* Center for Transatlantic Relations, Johns Hopkins University, 2003.

Pedersen, E.T., Colonel, Royal Danish Air Force. National Deputy, Joint Strike Fighter Program Office. Personal interview by author, JSF Program Office, Washington D.C., 2 and 3 October 2006.

Peters John E. et al., *European Contributions to Operation Allied Force: Implications for Transatlantic Cooperation.* Santa Monica: Rand Corporation, 2003.

Project Air Force 2001 Report. Santa Monica: Rand Corporation, 2001.

Risse-Kappen, Thomas. *Cooperation among Democracies: The European Influence on U.S. Foreign Policy*. Princeton: Princeton University Press, 1995.

Rizzo, Alessandro Minuto. Speech given at the Law Faculty, University of Zagreb, 23 February 2006. http://www.nato.int/docu/speech/2006/s060223a.htm (accessed March 2006).

Sachdev, Ameet. “Battle for U.S. Defense Work goes Global, Flies above Issues.” *The Chicago Tribune*, 23 July 2006.

Schmitt, Burkard. *Defense Procurement in the European Union: The Current Debate*. Paris: Institute for Strategic Studies, European Union, 2005.

Scruggs, David and Guy Ben-Ari. Defense analysts, Center for Strategic and International Studies, Washington D.C., Personal interviews conducted concurrently by author, 4 October 2006.

Sherwood-Randall, Elizabeth. *Alliances and American National Security*. Carlisle, PA: Strategic Studies Institute, 2006.

"Shifting Sand: Saudi Arms Deal." *The Economist*, 2 December 2006.

Sine, Jack L. II. "Organizing the Fight: Technological Determinants of Coalition Command and Control and Combat Operations." Master's Thesis, Naval Postgraduate School, 2006.

_____. Former Chief, Air Superiority Weapons Requirements, Weapons Division, Directorate of Operational Capability Requirements, Deputy Chief of Staff for Air and Space Operations, Headquarters U.S. Air Force. Personal interview by the author, Monterey, CA, 14 November 2006.

SIPRI Yearbook 2006: Armament, Disarmaments, and International Security. Stockholm: Stockholm International Peace Research Institute, 2006.

Sjursen, Helen, "Security and Defense." In *Contemporary European Foreign Policy*, edited by Walter Carlsnaes, Helen Sjursen and Brian White, 59-74. London: Sage Publishers, 2004.

Sloan, Stanley R. *NATO, the European Union, and the Atlantic Community: The Transatlantic Bargain Reconsidered*. Lantham: Rowan and Littlefield, 2003.

Spit, Madeleine. Colonel, Royal Netherlands Air Force National Deputy, Joint Strike Fighter Program Office. Personal interview by author, JSF Program office, Washington D.C., 3 October 2006.

"Sticker Shock: Estimating the real costs of modern fighter aircraft." *DefenseAerospace.com*, 12 July 2006. www.defense-aerospace.com (accessed July 2006).

Sweetman, Bill. "Technology Drives US Joint Strike Fighter Programme to the Limit." *International Defence Review*, 1 November 2006.

Tactical Aircraft: DOD's Cancellation of the Joint Strike Fighter Alternate Engine Program Was Not Based on a Comprehensive Analysis. Washington D.C.: United States General Accounting Office (May 2006) GAO-06-717R.

Tactical Aircraft: Opportunity to Reduce Risks in the Joint Strike Fighter Program with Different Acquisition Strategy. Washington D.C.: United States General Accounting Office (March 2005) GAO-05-271.

Tactical Aircraft: Recapitalization Goals are not Supported by Knowledge-based F-22A and JSF Business Cases. Washington D.C.: United States General Accounting Office (March 2006) GAO-06-487T.

Taylor, Phillip. "Weapons Standardization in NATO: Collaborative Security or Economic Competition?" *International Organization* (Winter 1982).

Tessmer, Arnold Lee. *Politics of Compromise: NATO and AWACS*. Washington D.C.: National Defense University Press, 1988.

"The Cheapest and the Best." *The Economist*, 12 April 1975, 55.

"The Code of Best Practice in the Supply Chain." *European Defense Agency*. Brussels: European Union, 2006.

"The JAS-39 Gripen: Sweden's 4th Generation Wild Card." *Defense Industry Daily*, 25 August 2006. http://www.defenseindustrydaily.com/2006/08/the-jas39-gripen-swedens- 4th-generation-wild-card/index.php (accessed August 2006).

The National Security Strategy of the United States of America. Washington D.C.: The White House, March 2006.

"The NATO-EU Strategic Partnership." in *The Istanbul Summit Media Guide*. Brussels: NATO Publication, 2004, 3-8. http://www.nato.int/docu/comm/2004/06-istanbul/press- kit/presskit-en.pdf (accessed November 2006).

The NATO Handbook. Brussels: NATO Public Diplomacy Division, 2006.

Thies, Wallace J., *Friendly Rivals: Bargaining and Burden-Shifting in NATO.* Armonk: M.E. Sharpe, Inc., 2003.

Thomas, Ian Q.R. *The Promise of Alliance: NATO and the Political Imagination*. Lantham: Rowan and Littlefield, 1997.

"Transatlantic Trends: Key Findings 2005," *German Marshall Fund*, 7 September 2005. http://www.transatlantictrends.org/doc/TTKeyFindings2005.pdf (accessed November 2006).

U.S. Department of State Website, http://www.state.gov/r/pa/ei/bgn/2874.htm (accessed November 2006).

VanPee, Harry, Lt. Col., Belgian Air Force. Representative to NATO for the European Air Transport Command, interview by email, 3 December 2006. Also personal interview 20 June 2006, Brussels, Belgium.

Verlinden, Francois. *Lock on No 2: General Dynamics F-16 Fighting Falcon.* O'Fallon, MO: Verlinden Publishing, 1983.

Vranek, Ric. Power Projection Division, Fighter Branch, Office of the Secretary of the Air Force for International Affairs, F-16 MNFP program and forecast upgrades, personal interview, 4 October 2006, Washington D.C.

Wallander, Celleste A. "Institutional Assets and Adaptability: NATO after the Cold War." *International Organization* 54 (Autumn 2000): 705-735.

Walt, Stephen M. *The Origins of Alliances.* Ithaca: Cornell University Press, 1987.

Watkins, Harold D. “The Politics of the F-16.” *Forbes*, 15 December 1976, 61.

Wayne, Leslie. “British Arms Merchant with Passport to the Pentagon.” *New York Times,* 16 August 2006.

“What sold the F-16 to the Europeans.” *Business Week,* 21 April 1975, 34-35.

White, David. “Take-off for the Eurofighter.” *Financial Times,* 17 May 1988, Editorial Section, 22.

Zimmermann, Hubert. *Money and Security.* Cambridge: Cambridge University Press, 2002.

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